7.520 RECENT WORK ON PROTEINS, WITH SPECIAL REFERENCE TO PEPTIDE BIOSYNTHESIS AND NUTRITIVE VALUE

Bender, A. E.
Journal of the Science of Food and Agriculture 5, No. 7, 305-318 (July 1954)

Two aspects of the protein field are discussed: the biosynthesis of the peptide bond (which is associated with protein 'turn-over' in the body) and the nutritive value of protein.

The present conception of protein metabolism is illustrated in figure 1 (this card, over). Proteins have a high rate of metabolism and the synthesis of proteins of the tissues is largely a question of the synthesis of the peptide bonds. Work that has been done on this problem is discussed.

A balance of the essential amino acids is necessary to synthesize protein. Thus, if any one essential amino acid is present in an inadequate amount, the biological value of the diet is limited. Despite this, for the following reasons it is still not possible to determine biological value from the amino acid composition: (1) Amino acid content is not necessarily the same as the mixture available to the metabolic mechanism of the cell where the amino acids are to be used. (2) It is possible to alter the composition of some of the protein synthesized. (3) The amino acid content of a protein can not be measured with any degree of accuracy. (4) There are theoretical objections to the suggestion of Mitchell and Block (J. Biol. Chem. 163:599 (1946)) that there is a straight line relationship between the biological value measured on animals and the percentage of the limiting amino acid contained in egg albumin.

A number of factors are involved in the availability of a protein. Enzymes may not be able to hydrolyze a protein completely. Heat has been shown to make the amino acids of a protein less available. Three types of damage can occur: (a) interaction between amino acids resulting in an enzyme-

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 ABSTRACTER: Neva L. Karrick

7.53 DETERMINATION OF FAT IN HERRING MEAL

Astrup, Harald (Herring and Herring Meal Industry Research Institute, Bergen, Norway)
Meldinger fra SSF, No. 5, 75-78 (August 1954)

Reliable values for the fat content of herring meal are difficult to obtain because so many different methods of analysis are in use. The official Norwegian method for the determination of fat in herring meal is based on ether extraction in a soxhlet apparatus. This method is not generally used as a control in herring meal factories, however, because another method is preferred. In the herring meal factories the sample is usually rubbed with anhydrous Na_2SO_4 and this mixture is shaken with benzene. Systematic tests in the laboratory showed that the official method gives only about 90% of the fat found by the benzene method.

It is general knowledge that the amount of fat that can be determined analytically decreases with the length of time that the meal has been held in storage. Meal that had been held in storage for 9 months and then extracted by the ether method showed a 0.7% decrease in fat content. The difference in the amount of fat obtained by the two methods of extraction, however, tends to decrease from about 0.9% of the fat in the fresh meal to about 0.6% of the fat in 9-month-old meal. Extraction in the soxhlet apparatus with acetone instead of ether gave results in close agreement with the benzene method. The amount of fat that can be determined was also influenced by drying the sample before extraction. Rubbing the sample with $CaSO_4$ instead of drying in an oven at 100° C. and then extracting with either ether or acetone gave about 3% additional fat.

Table 4 (omitted) shows the free-fatty-acid content of fat that was fractionally extracted from herring meal with boiling ether, boiling acetone, and cold benzene. Little difference exists between the free-fatty acid content of the fractions extracted with benzene and the fractions extracted with

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 ABSTRACTER: Martin Heerdt

7.641 MICROBIOLOGICAL ASSAY OF VITAMIN B_{12} AND PSEUDOVITAMIN B_{12}

Berman, D.; Yacowitz, H.; and Weiser, H. H.
Poultry Science 33, No. 5, 1043 (September 1954)

A differential microbiological assay was developed for vitamin B_{12} and pseudovitamin B_{12}. The method involves the assay of samples with two different microorganisms, Lactobacillus leichmannii ATCC 7830 and Lactobacillus acidophilus ATCC 832. Since pseudovitamin B_{12} is much more active than vitamin B_{12} for Lactobacillus acidophilus, samples containing pseudovitamin B_{12} will yield higher values in the acidophilus assay than in the leichmannii assay. Using mixtures of crystalline vitamin B_{12} and pseudovitamin B_{12} quantitative determinations could be made by assaying with both organisms. The two assay values were used in simultaneous equations to calculate the amounts of each vitamin present.

When the differential assay was used on several commercial vitamin B_{12} supplements one supplement apparently contained some pseudovitamin B_{12}-like activity. This was confirmed by a chick assay in which it was found that the chick response was considerably lower than the guaranteed potency of the B_{12} supplement. A sample of fish solubles was found to contain an appreciable quantity of pseudovitamin B_{12}-like activity. Fresh chick droppings obtained from vitamin B_{12} deficient chicks contained little or no vitamin B_{12}; practically all the activity was due to microbiologically active substances other than vitamin B_{12}. Lyophilized beef liver and kidney contained only vitamin B_{12}.

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7.641 DETERMINATION OF VITAMIN B_{12} CONTENT OF FEED SUPPLEMENTS AND EFFECT OF PSEUDO-VITAMIN B_{12}

Chaiet, Louis; Miller, Thomas; and Boley, A. E.
Journal of Agriculture and Food Chemistry 2, No. 15, 784-786 (July 21, 1954)

Pseudovitamin B_{12}, a compound isolated from anaerobic fermentation, has many of the properties of vitamin B_{12} including microbial growth activity and an almost identical absorption spectrum. The compounds can be differentiated by paper strip chromatography, ionophoresis, counter-current extraction with benzyl alcohol-water, and by animal tests, where pseudovitamin B_{12} is inactive. A microbial assay utilizing an Ochromonas organism is specific for cyanocobalamin.

The isotope dilution method has been used to evaluate and control the vitamin B_{12} content of crude concentrates and commercial feed supplements. The isotope dilution assay must satisfy two criteria: (1) The cobalamins present in the concentrate or feed supplement must be converted to cyanocobalamin before the addition of the tracer. (2) The cyanocobalamin must be isolated and differentiated from similar compounds so that a measurement of the isolated material is essentially that of cyanocobalamin alone.

Samples of commercial vitamin B_{12} products were assayed by the isotope dilution method, the U.S.P. L. leichmannii titrimetric and turbidimetric assay methods, L. lactis Dorner and E. coli cup plate methods and a chick growth test method. The activity measured by the U.S.P. microbial is 16 percent higher than that found by the isotope dilution method. One of the commercial products contained essentially no vitamin B_{12} when assayed by the isotope dilution method or by the chick growth test. The principle active microbiologically was pseudovitamin B_{12}.

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 ABSTRACTER: Neva L. Karrick

NUTRITIVE VALUE OF PROTEINS

VITAMIN B_{12} AND PSEUDOVITAMIN B_{12}

DETERMINATION OF FAT IN FISH MEAL

DETERMINATION OF VITAMIN B_{12}

7.641

Methods used to isolate pseudovitamin B_{12} are described. Radioactive vitamin B_{12} tracer was used to check extraction efficiency. Pseudovitamin B_{12} is a red compound whose absorption spectrum is nearly identical with that of vitamin B_{12}.

The two compounds differ in the following: Pseudovitamin B_{12} has essentially no growth activity for chicks. It has a higher distribution constant in the system water-benzyl alcohol. It also has a higher nitrogen content. The compounds can also be separated by ionophoresis and paper strip chromatography.

Seventeen references are given.

7.520 (Cross Reference: 0.32)

resistant link, which is hydrolyzed by acid; (b) inter-action between amino acids and carbohydrates forming enzyme-resistant but acid-vulnerable links; and (c) reaction of free amino groups and sugars resulting in destruction of the amino acid. Proteins vary in digestibility and the fraction of protein lost in undigested matter is usually unknown. The rates of liberation and absorption of the amino acids are important factors in the biological values of proteins.

The chemical score of a protein is 100 minus the percentage deficit of the limiting amino acid. The authors discuss a proposed revision of the relationship of chemical score to biological value. If there is an unavailable amino acid, the biological value is lower than would be expected from the chemical score. There are also instances in which the biological value is higher than would be expected.

A large number of biological values must be determined to examine the relationship with chemical score. The authors suggest the following method. With four litters of eight rats, eight experimental groups are arranged. For ten days one group is fed a non-protein diet and each of the other groups is fed a test protein. The rats are killed and their bodies analyzed for total nitrogen. Because there is a constant relation between water and nitrogen content of the rat, dependent only upon age, nitrogen can be determined from water measurement. From this and nitrogen consumption, net protein utilization is calculated. The biological value can be calculated from digestibility.

This method can be used to determine the limiting amino acids. The test protein is fed unsupplemented and with triple combinations of nine essential amino acids (arginine is excluded). Two triads will cause an increased biological value and the amino acid in both will be the limiting amino acid.

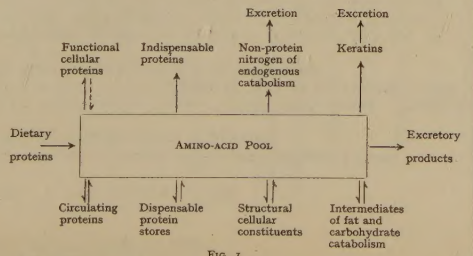

Fig. 1

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acetone. This indicates a good recovery of fat. In contrast, extraction with ether tended to differentiate the fractions. The solvent employed for extraction appeared to be the main reason for this difference between methods.

8.42 ENVIRONMENTAL RELATIONS OF MODIFICATION COMPOSITIONS OF CERTAIN CARBONATE-SECRETING MARINE INVERTEBRATES

Lowenstam, Heinz A.
Proc. Natl. Acad. Sci. U. S. 40, 39-48 (1954)
Chemical Abstracts 48, No. 14, 8436 (1954)

Within certain classes of marine invertebrates, the mineralogy of the skeletal materials has been found to be dependent on environment. This contradicts the widespread view that the skeletal compns. of marine invertebrates other than gastropods and pelecypods are genetically fixed, and thus, within any taxonomically defined limits, consist either entirely of calcite (I) or aragonite (II). In a study of serpulid worm tubes, modification compns. ranged from 100% I through various percentages of I and II to 98% II. For these organisms the compn. is at least partially dependent on environmental temp., higher percentages of II being observed at higher temps. Salinity probably also exerts some influence. A preliminary survey indicates that the observed temp. effect extends to the spirorbidae, and several pelecypods and gastropods; in fact in certain of the mollusca, variation of the modification compn. within the population of a single species was demonstrated. A study of Mytilidae indicated that the variation of compn. with temp. is sometimes limited by the inability of an individual to lay down a shell below a certain temp.

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8.53 FAT CONTENT OF HERRING, SPRAT AND MACKEREL 1949-1952

Bramsnaes, F.; Mogensen, Erik; and Birno, K. E.
Meddelelse fra Fiskeriministeriets Forsogslaboratorium (in Danish), February 1954, 15 pp., English summary and tables

Herring from the North Sea area caught in 1949 between July 16 and November 3; in 1950, between July 20 and October 20; and in 1951, between July 29 and November 3, showed the highest fat content in the month of August and then declined throughout the rest of the period (table 1, this card, over). The fat content was, on the average, higher in 1950 and 1951 than in 1949.

The fat content of winter herring caught in the Skagerak between November 15, 1949 and April 17, 1950, and between December 27, 1950 and April 29, 1951 fell off towards the end of the season and was lower in 1949-1950 than in the succeeding years (table 4, omitted, 5 and 6, this card, over). The fat content of herring taken from the Skagerak during the period July 9 to October 30, 1951 was highest during July-August and then fell off similarly to North Sea herring. Herring taken around Esbjerg from the Bloeden ground during July to November 1949, 1950, 1951, spring 1952 and autumn 1952 decreased in average size from 1949 to 1952 (table 7, omitted). In 1951 the fat content fluctuated considerably, apparently because of the size of the herring.

Sprats (brisling) received during the winter season 1947-1948 from Kerteminde and in 1949-50, and 1950-51 from Kerteminde and from other places as well, had a fat content that reached its maximum in October (about 20%) and then decreased steadily to as low as 2% fat during May (table 8, omitted). Sprats taken in 1947 contained more fat than those taken in the later years. There also appeared to be some correlation between the size of the sprats and their fat content.

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 ABSTRACTER: Martin Heerdt

8.50 THE ORGANIC CONSTITUENTS OF MAMMALIAN COMPACT BONE

Eastoe, J. E. and Eastoe, B.
Biochemical Journal 57, No. 3, 453-457 (July 1954)

The object of the present study was to obtain information about the composition of compact bone tissue. In part 1 of this study ox-femur bone was freed from extraneous tissues and powdered without any appreciable chemical degradation. The bone was then separated into its known constituents by the following procedure: Collagen, the principal organic constituent, was dissolved and converted into gelatin by prolonged extraction with water at 100°C. The residue that remained consisted of organic matter with a small amount of protein which resisted solution in boiling water, and inorganic matter, some of which was dissolved during hot-water extraction.

Hydrochloric acid was used to dissolve the inorganic matter from this residue. The remaining organic matrix was then extracted with lime water and a mucopolysaccharide-protein complex was obtained. Finally, the residue, which consisted mainly of water-resistant protein, was extracted with hot water to remove any remaining collagen. These processes were carried out quantitatively, and a balance sheet was assembled to account for the entire bone in terms of its known constituents.

In part 2 of the study, analytical techniques were used to study the organic constituents of bone. Quantitative analysis accounted for 99% of the bone in terms of inorganic matter, collagen, mucopolysaccharide-protein complex, and resistant protein. Bone fat and carbohydrates other than the mucopolysaccharide were completely absent from compact bone. No difference was found between bone collagens and collagens from other tissues. The protein that was resistant to solution in hot water was found to be heterogeneous, in that one portion resembled cartilage tubes, whereas the other was an amorphous powder. The mucopolysaccharide-protein complex was found to contain the sugar

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 ABSTRACTER: Martin Heerdt

8.59 ENZYMES OF LOBSTER TISSUES

Kermack, W. O.; Lees, H.; and Wood, J. D.
Biochemical Journal 57, No. 3, xxii-xxiii (July 1954)

Aerobic Warburg experiments, which were conducted under various conditions, showed that the oxygen quotient (q_{O_2}) for lobster muscle and hepatopancreas tissue was less than 0.01 and 0.08 μl. O_2 per hr. per mg. wet weight, respectively, at both 25° and 37°C. The q_{O_2} of lobster muscle was not affected by the addition of magnesium, adenylic acid, and cytochrome c, whereas the q_{O_2} of hepatopancreas tissue was increased about 75% by the addition of these compounds. This effect was found to be dependent upon cytochrome c.

The addition of p-phenylene diamine alone caused only a small increase in the q_{O_2} of hepatopancreas tissue, whereas in the presence of cytochrome c the q_{O_2} increased to 0.54. On the basis of this increase it appeared that the hepatopancreas tissue contained cytochrome oxidase.

Various possible metabolites were without effect on the q_{O_2} of lobster muscle both with or without the addition of magnesium, adenylic acid, and cytochrome c. Negative effects were also obtained with hepatopancreas tissue except when acetaldehyde, methylglyoxal, and other aldehydes were added. In this respect the aldehyde oxidase activity of hepatopancreas tissue resembled that of pig liver. At pH 7.5, hepatopancreas tissue with added acetaldehyde showed a total oxygen uptake below the theoretical value, whereas at pH 5.3 the total oxygen uptake was 99% of the theoretical value. Quinine as an additive failed to increase the q_{O_2} of hepatopancreas tissue; therefore, it appears that lobster hepatopancreas enzyme, unlike mammalian liver aldehyde oxidase, does not oxidize quinine. The addition of azide to lobster muscle and hepatopancreas tissue increased the q_{O_2} at pH 7.1 but not at pH 5.3 unless azide was present in large quantities, under which conditions a decrease in q_{O_2} was

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 ABSTRACTER: Martin Heerdt

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residues galactosamine, glucosamine, hexuronic acid, galactose and mannose. Xylose of unknown origin was also found in the hydrolyzate. The entire nitrogen content was accounted for by quantitative determination of the amino acids and hexosamines. Unlike collagen, the amino acid composition of the resistant protein was somewhat similar to blood serum proteins.

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obtained. The presence of glyoxalase in tissue of certain invertebrates has been detected by the formation of acid from methylglyoxal in the presence of glutathione. Glyoxalase was shown to be present in lobster muscle which had a Q_{O_2} of 0. 85 and in hepatopancreas tissue which had a Q_{O_2} of 1. 34.

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The fat content of mackerel obtained from several fishing ports during the years 1948-1950 was found to rise during each season but to vary with the year and the fishing ground.

Tabel 1. Nordsøsild 1949. *(North Sea Herring.)*

Dato *Date*	Antal prøver *Number of samples*	Totalfangst *Total catch* tons	Middelfedtindhold *Average content of fat* %	Middelvandindhold *Average content of dry matter* %
16/7 - 29/7	6	68.0	15.8	33.4
30/7 - 12/8	5	66.8	16.1	35.0
13/8 - 26/8	4	40.8	14.4	34.5
27/8 - 9/9	4	72.9	12.6	34.2
10/9 - 23/9	10	148.4	13.9	35.1
24/9 - 7/10	6	57.5	12.2	32.6
8/10 - 21/10	3	23.5	12.4	31.8
22/10 - 3/11	1	7.6	10.4	27.1
16/7 - 2/11	42	479.5	14.0	34.0

Tabel 5. Skagerak vintersild 1950/51. *(Winter Herring from Skagerak.)*

Dato *Date*	Antal prøver *Number of samples*	Totalfangst *Total catch* tons	Middelfedtindhold *Average content of fat* %	Middelvandindhold *Average content of dry matter* %
27/12 - 9/1	4	12.7	6.6	26.3
10/1 - 23/1	5	24.4	7.0	25.3
24/1 - 6/2	6	11.9	6.3	24.4
7/2 - 20/2	7	24.5	5.4	23.2
21/2 - 6/3	4	12.8	5.1	23.6
7/3 - 20/3	4	2.1	3.1	22.8
21/3 - 3/4	1	6.6	6.6	25.7
4/4 - 17/4	5	29.3	3.0	20.6
18/4 - 1/5	2	0.7	2.3	20.4
27/12 - 1/5	38	124.4	5.3	23.1

Tabel 6. Skagerak høstsild 1951. *(Autumn Herring from Skagerak.)*

Dato *Date*	Fangst *Catch* tons	Længde *Length* cm	Feitprocent *Fat per cent*	Tørstofprocent *Dry matter per cent*
9/7	3.0		11.4	
28/7	3.0	25	22.4	39.5
17/8	21.8	22	19.9	36.3
18/8	22.8	21	17.5	35.6
26/8	4.7	21.9	24.0	39.0
29/8	5.4	24	20.4	37.3
3/9	7.4	21.3	21.6	38.7
11/9	5.5	22.8	16.6	36.7
16/10	0.6	22.8	15.1	32.1
17/10	3.6	21.3	9.5	35.1
29/10	0.7	23.6	10.8	28.1
30/10	1.3	24.5	13.9	30.8
	62.5		18.8	36.8

9.14 SPRING CHINOOK SALMON DIET EXPERIMENTS AT THE BONNEVILLE HATCHERY

McKee, Thomas B.; Sinnhuber, R. O.; and Law, D. K.
Fish Commission of Oregon Research Briefs 3, No. 2, 22-31 (August 1951)

This is the first in a series of progress reports on feeding experiments that were conducted: (1) to compare standard diets for spring chinook salmon; (2) to start preliminary work in selecting a suitable economic food for young salmon; (3) to investigate the adequacy of various diets during the cold-water period of winter.

About 15,000 spring chinook salmon of the 1948 brood were fed during the period September 15, 1949 to March 15, 1950. These were transferred from Oak Ridge, Middle-Willamette salmon hatchery to the Bonneville Dam hatchery located on the Columbia River, in August 1949. They were fed twice daily on a diet of 100% fluky beef liver until September 15, when the experimental feeding program was started. Wooden troughs, 11 feet long by 18 inches wide with a water depth of 11 1/2-inches were used to contain the salmon. Water from Tanner Creek was admitted to each trough at the rate of 15 gallons per minute. Each trough was stocked with 3,500 gr. of fish.

Table 1 (this card, over) shows the various diets used in the experiments. All of the lots of fish were fed mid-morning and mid-afternoon. During the month of January, the fish were fed three times daily in the hope that better consumption and utilization of food would be obtained. All of the diets were prepared and fed daily through a hand ricer except diet No. 5, which was sprinkled across the surface of the trough at the upper end. Each lot of fish was weighed every two weeks. At that time the weight of food for the coming two-week period was calculated. This weight was based on a dry-food weight of 1.03% of the weight of the group of fish.

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 ABSTRACTER: Martin Heerdt

9.14 SECOND PROGRESS REPORT ON SPRING CHINOOK SALMON DIET EXPERIMENTS

McKee, Thomas B.; Jeffries, Ernest R.; McKernan, Donald L.; Sinnhuber, R. O.; and Law, Duncan K.
Fish Commission of Oregon Research Briefs 4, No. 1 (December 1952)

The Seafoods Laboratory and the Fish Commission of Oregon are attempting by means of a series of experiments at Bonneville Hatchery to develop economical substitutes for condemned beef liver that is commonly used for feeding young salmon. One test diet successfully fed to rainbow trout was the Wisconsin purified diet developed by McLaren et al (1947). This diet was composed of 18% dextrin, 52% vitamin-free casein, 8% crab meal, 6% supplemental salts IV, 1% calcium carbonate, 2% cod liver oil, 13% corn oil, crystalline B vitamins, and ascorbic acid, with 10 parts of gelatin per 100 parts of the above mixture. McKee, Sinnhuber, and Law (1951) found that the Wisconsin diet was inadequate for the growth and development of spring chinook salmon fingerlings reared in Tanner Creek water at Bonneville Hatchery.

To continue the study, 12 new diets were prepared and fed under controlled conditions to spring chinook salmon fingerlings selected at random in the manner previously described by McKee, Sinnhuber, and Law (1951). Diets 5, 6, 7, 9, and 10 were based on the Wisconsin diet that had been modified by the addition of vitamin B_{12} and procaine penicillin, and supplemented, respectively, with salmon liver, beef liver, yellow-fin tuna liver, condensed herring solubles, and salmon eggs. A description of the specific diets appears as a part of this abstract. One firwood tank, 6 feet in diameter with a 16-inch water depth was assigned for use with each of the 12 diets. Each of the 12 tanks was initially stocked with 350 grams, or approximately 950 fish. Feeding began on August 1, 1950 and ended on February 26, 1951. The fish were fed from 2 to 4 times daily and 6 days each week.

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 ABSTRACTER: Martin Heerdt

9.3 THE DEVELOPMENT OF FEDERAL SPECIFICATIONS

Anonymous
Commercial Fisheries Review 16, No. 9, 24-26 (September 1954)

Assignment: A new method of developing Federal specifications was put into effect on July 6, 1954. By this method the responsibility for the development of specifications will be assigned by the General Services Administration to other Federal agencies with their consent. Normally the assigned agency will also be responsible for maintaining the specification.

Definition: A specification is a clear and accurate description of the technical requirements for a material, a product, or service, including the procedure by which it will be determined that the requirements have been met.

1. Federal. A specification covering those materials, products, or services, used by two or more Federal agencies (at least one of which is a civil agency), or new items of potential general application, promulgated by the Administration for mandatory use by all Federal agencies.
2. Interim Federal. A specification intended for final processing as either a new or revised Federal Specification, issued in interim form for mandatory use by the agencies specified in the preamble to the specification, but which may be used by other agencies; or issued to cover immediate procurement needs of one agency but which may be of interest to another Federal agency.

Basic Requirements: The basic requirements observed in the development of a specification are:

1. The requirements of all Federal agencies having an interest in the items shall be considered.
2. The number of types, grades, colors or finishes, and varieties specified shall be held to the minimum consistent with optimum over-all efficiency and economy of the operations or services to be performed.

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9.14 THIRD PROGRESS REPORT ON SPRING CHINOOK SALMON DIET EXPERIMENTS

Jeffries, Ernest R.; McKee, Thomas B.; Sinnhuber, Russell O.; Law, Duncan K.; and Yu, T. C.
Fish Commission of Oregon Research Briefs 5, No. 1 (March 1954)

This report tells of the progress made by the Fish Commission of Oregon and the Seafoods Laboratory in developing salmon hatchery feed substitutes for beef liver, and in appraising existing and potential hatchery feed components.

To continue the study, 12 new diets were prepared and fed under controlled conditions to spring chinook salmon fingerlings that had been selected at random. All of the salmon were reared at Bonneville Hatchery in circular firwood tanks each 6 feet in diameter. Each tank was supplied with water to a depth of 16 inches and stocked with 2,000 grams or approximately 1300 spring chinook salmon fingerlings. Feeding began on May 22, 1951 and ended on October 24, 1951. All fish were fed from 2 to 4 times daily and 6 days each week on a dry weight basis as described in the second progress report. The Wisconsin diet was modified further to approximate the chemical composition of the all-meat ration that gave such excellent results in previous tests. This diet, renamed the Oregon diet, contained 55% vitamin-free casein, 18% dextrin, 1% calcium carbonate, 4% crab (Cancer magister) meal, 6% supplemental salts, and 16% corn oil, plus 10 parts of gelatin as a binding agent for each 100 parts of the foregoing mixture. All lots (diets) were adjusted to have the same moisture content as lot 2. Lot 1 was the Oregon diet. Lot 2 was composed of equal parts of fresh frozen beef liver, hog liver, and salmon viscera plus 2% salt. Lot 3 was composed of 90 parts of the Oregon diet and Argentine beef liver meal equivalent to 10 parts of fresh frozen beef liver. Lot 4 was composed of 90 parts of the Oregon diet and 10 parts of fresh frozen beef liver. Lot 5 was composed of 90 parts of the Oregon diet and drum dried beef liver meal equivalent to 10 parts of fresh frozen beef liver.

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 ABSTRACTER: Martin Heerdt

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3. Wherever practicable, functional or performance requirements, rather than design, construction, or compositional requirements, shall be specified.

4. Requirements shall be written to give full consideration to end use and economy and to encourage maximum participation by industry in the Government supply program.

5. Nationally recognized industry, technical society, and other commercial specifications and standards shall be used and adopted to the maximum extent practicable.

6. Specification requirements which can be met by products of standard commercial construction, manufactured by business enterprises for general commercial use, shall be adopted to the maximum extent consistent with Government requirements.

7. The preservation, packaging, packing, and marking requirements in specifications shall be uniform to the greatest extent practicable consistent with the varying needs of Federal agencies for domestic and export shipment.

8. Consideration shall be given to the conservation of critical materials.

Responsibility:

1. That the specification is adequate for use by the Federal agencies.

2. That representatives of industry properly concerned are afforded an opportunity to make recommendations.

3. The methods of sampling, inspection, and test required have been tried and found to be satisfactory.

Interim Specifications: As a rule, Federal Specifications shall be issued initially as Interim Specifications. Except when GSA approves issuance for the immediate procurement needs by an agency, Interim Specificiations shall be coordinated with Federal agencies and with industry to the extent the assigned agency determines to be necessary.

Procedure: Figure 1 (omitted) shows the flow chart for the development of Federal and interim Federal specifications.

9.14 (Cross Reference: 1.31)

Lot 6 was composed of 90 parts of the Oregon diet with partial casein replacement with drum-dried hake meal and 10 parts of fresh-frozen beef liver. Lot 7 was composed of 90 parts of the Oregon diet with partial casein replacement with drum-dried turbot meal, and 10 parts of fresh-frozen beef liver. Lot 8 was composed of 90 parts of the Oregon diet with casein replacement with drum-dried salmon viscera, and 10 parts of fresh-frozen beef liver. Lot 9 was composed of 90 parts of the Oregon diet with partial casein replacement with commercial salmon meal, and 10 parts of fresh frozen beef liver. Lot 10 was composed of 95 parts of the Oregon diet, and 5 parts of sardine solubles. Lot 11 was composed of 90 parts of the Oregon diet and grasshopper meal equivalent in total solids to 10 parts of fresh-frozen beef liver. Lot 12 was composed entirely of Wolf's synthetic diet with water added to yield an 80% moisture content.

The results from feeding these 12 different lots were as follows: Lot 1, low weight gain but with good general condition and no anemia, low mortality. Lot 2, an excellent diet, fish in good condition. Lot 3, weight gain similar to the 100% Oregon diet, some evidence of anemia at the end of the experiment. Lot 4, balanced diet with good weight gains, low mortality. Lot 5, weight gains not as good as with Lot 4, but better than with Lot 1, low mortality, fish in good condition. Lot 6, superior to all control diets (lots 1, 2, and 4), low mortality, the second most successful diet. Lot 7, the most successful diet, low mortality. Lot 8, a well-balanced diet with weight gains slightly below the gains produced by Lot 2, lowest mortality, the fish were active feeders and in good condition. Lot 9, growth and weight average, low mortality, appetite fair, weight gains considerably below Lot 2. Lot 10, weight gains fair, growth less than with Lot 4. Lot 11, growth slightly below growth obtained with Lot 4, mortality low, fish active, alert, and hungry. Lot 12, unsatisfactory, high mortality, low growth, some anemia at end of experiment.

9.14 (Cross Reference: 1.31)

Diet No. 2 gave the best results. The addition of biological salts to the beef liver as a binder resulted in less leaching of soluble materials and may have been responsible for the superior growth which resulted. Diet No. 3 was found to be inferior. The fish ate well but poor growth and heavy mortalities resulted. Diet No. 4 was found to be superior. Diet No. 5, the dry-blown diet, was inadequate. The fish refused to eat and never did become accustomed to the ingredients in this diet. Diet No. 6, the purified diet, also proved inadequate for the maintenance of growth. The fish ate well but soon developed characteristics of anemia.

Mortalities increased when water temperatures decreased sharply.

TABLE 1.
COMPARISON OF THE EXPERIMENTAL DIETS

Lot Number	Composition	Percentage Composition
1.	Fluky beef liver control	100.0
2.	Fluky beef liver	96.0
①	Supplemental salts	4.0
② 3.	Fluky beef liver	14.7
	Salmon viscera	81.3
	Brewers yeast	2.0
	Salt (NaCl)	2.0
③ 4.	Fluky beef liver	22.06
	Hog liver	22.06
	Hog spleen	22.06
	Salmon viscera	31.86
	Salt (NaCl)	1.96
④ 5.	Meals	60.0
	Fluky beef liver (blower diet)	40.0
④ 6.	Dextrin	18.0
	Casein (vitamin free)	52.0
	Crab meal	8.0
⑤	Supplemental salts	6.0
	Calcium carbonate	1.0
	Corn oil containing Vitamins A, D and E	15.0
	Water soluble vitamins (1 part gelatin added to 10 parts of above mixture)	

① The composition of the supplemental salts used in diets No. 2 and 6 was as follows:

NaCl	335 grams	KI	1.6 grams
$K_2HPO_4 \cdot 3H_2O$	845 grams	$MnSO_4 \cdot 4H_2O$	0.7 grams
$Ca_3H_4(PO_4)_2 \cdot 4H_2O$	190 grams	$ZnCl_2$	0.8 grams
$MgSO_4 \cdot 7H_2O$	204 grams	$CuSO_4 \cdot 5H_2O$	0.6 grams
$CaCO_3$	600 grams	NaF @ 0.2% of complete ration	
$Fe(C_6H_5O_7)_2 \cdot 6H_2O$	55 grams	total (wet weight) or	4.46 grams

② This is one of the experimental diets used by the Washington State Department of Fisheries.
③ This is one of the production diets used by the U. S. Fish and Wildlife Service at their Leavenworth, Washington, station.
④ This is one of the experimental diets used by Dr. L. R. Donaldson at the University of Washington School of Fisheries. The composition of the meals used in diet No. 5 was:

Tomato pulp	10%	Commercial flame dried fish meal	30%
Alfalfa meal	10%	Air dried salmon meal	10%
Wheat germ	5%	Crab meal	10%
Brewers yeast	10%	Kelp meal	5%
Salmon egg meal	10%		

⑤ Wisconsin purified diet (McLaren, et al. 1946, 1947)

9.14 (Cross Reference: 1.31)

From August 1 to November 7, the dry weight of the food fed daily was equal to 2% of the body weight of the salmon; from November 7 to 21, it was equal to 1 1/2%; and from November 21 to February 26, it was equal to 1%. The diets and the results obtained are as follows:

Diet 1, the control diet, (98% beef liver and 2% salt) was poorly balanced. The fish gained weight slowly and exhibited a nervous condition. Diet 2 (96% beef liver and 4% supplemental salts IV) gave no better growth than diet 1 except that it eliminated the nervous condition. Diet 3 (76% beef liver, 10% corn oil, 10% commercial salmon meal, and 4% supplemental salts IV) was superior to the control diet in that added calories were furnished by the corn oil. Diet 4 (equal parts of fresh-frozen beef liver, hog liver, and salmon viscera plus 2% salt) was superior to diet 1. Diets 5, 6, 7, 9, and 10 were adjusted to the same moisture content as diet 4. Diet 5 (90 parts of dry Wisconsin ration and 10 parts of frozen tuna liver) was unsatisfactory. Diet 6 (90 parts dry Wisconsin ration, 10 parts salmon liver) was unsatisfactory. Diet 7 (95 parts dry Wisconsin ration and 5 parts herring condensed solubles) was unsatisfactory. Diet 8 (32.7% hog liver, 32.7% salmon viscera, Argentine beef liver meal equivalent to 32.6% liver on a wet basis, and 2% salt) gave growth that was superior to diet 1 and comparable to diet 4. Diet 9 (90 parts dry Wisconsin ration and 10 parts salmon eggs) gave poor growth and high mortality. Diet 10 (90 parts dry Wisconsin ration and 10 parts fresh frozen beef liver) was superior to diet 1 and adequate for growth. Diet 11 (40% beef liver, 6% tomato meal, 6% alfalfa meal, 3% wheat germ, 6% brewers' yeast, 6% salmon meal; 6% crab meal, 3% kelp meal; 6% salmon egg meal, and 18% commercial fish meal) was inedible. Diet 12 (97% hake, 19% beef liver, and 2% salt) was moderately successful in promoting growth but much of the food leached into the water and became unavailable.

7.43 REPORT ON TOTAL SOLIDS AND ETHER EXTRACT IN FISH

Risley, H. M.
Journal of the Association of Official Agricultural Chemists 37, No. 3, 602-607 (August 15, 1954)

Total Solids

Five different samples of fish were submitted to collaborators for total solids determinations. All collaborators used the air oven method and some used both a forced draft oven and a vacuum oven. Samples used were canned pink salmon, canned chinook salmon, fresh skinless and bonless fillets of halibut, chinook salmon, and rockfish.

To determine total solids a 9-cm. flat-bottom covered weighing dish was prepared in the following manner: About 2 g. of asbestos fibers of the type used in preparing Gooch crucibles were cut into short lengths and these, with an 8-cm. stirring rod with flattened end, were added to the weighing dish. They were then dried in an air oven for 1 hour at 100°C. and tared. Nine to ten grams of prepared sample, weighed to the nearest mg., and 20 ml. of distilled water were mixed with the asbestos, evaporated just to dryness on a steam bath, and heated 4 hours in an air oven at 100°. The dish was covered, cooled in a desiccator and weighed promptly.

The collaborators determined tot: ' solids in duplicate, then repeated the determinations, using a forced draft oven at 100° C. for one hour, then a vacuum oven at 100° C. for four hours.

The results on the two samples of canned fish were more uniform than the results on the three samples of fresh fish. The Associate Referee believes that if the fresh fish could be as finely ground as the canned samples, much closer agreement would be obtained. It is believed that if apparent

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 ABSTRACTER: Neva L. Karrick

7.43 REPORT ON SOLIDS IN RAW OYSTERS

Traynor, John P.
Journal of the Association of Official Agricultural Chemists 37, No. 3, 607-614 (August 15, 1954)

Preliminary work showed that position of dishes in the oven had little effect on the results and that it was unnecessary to dry the oysters on the steam bath prior to heating in the oven. It was found that drying for two hours at two-thirds draft or for one and one-half hours at full draft produced results in close agreement with the official A.O.A.C. method.

The method, which is given in detail, was studied by seven collaborators. The report of the collaborators indicated approval of the method.

Another method checked was that of drying the oysters at 130° in a convection oven for 1 hour, 1.5 hours, and 2 hours. This method was unsatisfactory because: (1) there was too much variation between this method and the official method; (2) there was no saving in time since preliminary drying on the steam bath was necessary; and (3) the oysters dried at 130° showed darkening and browning.

The proposed procedure for the determination of solids in oysters reads:

"Make duplicate determinations. Weigh quickly 10 g. of meats, liquid, or mixed meat and liquid, in flat-bottom metal dish ca 9 cm. in diameter. Spread sample evenly over bottom of dish, insert directly in preheated forced draft oven set at full draft, and dry 1.5 hours at 100° C. Cool in desiccator and weigh promptly."

(over)

 ABSTRACTER: Neva L. Karrick

7.641 THE CHEMICAL METHOD FOR DETERMINATION OF VITAMIN B_{12} BY RUDKIN AND TAYLOR

Kurmeier, Hans
Die Fischwirtschaft 6, 46-8 (1954)
Chemical Abstracts 48, No. 13, 7679 (1954)

Several modifications permit analysis of fish meals and similar products. The defatted product is extd. with 82% MeOH. The filtrate is dried in a vacuum oven, re-extd., filtered, and dried. The material is extd. with H_2O, filtered, and made to vol. The soln. is treated with Na_2SO_4 after adjusting to pH 7.5. It is extd. with benzyl alc. and filtrates are treated with $CHCl_3$ and ext. with H_2O. The ext. is treated with 1% NaCN and pH is adjusted to 9.5-10. The soln. is let stand overnight, and 20% Na_2SO_4 is added. This is extd. with benzyl alc. The ext. is treated with 10% NaCN and 12.5% KH_2PO_4 and allowed to stand 24 hrs. The extinction coeff. at 578 mμ was found to be satisfactory. Detailed directions of analysis are given. Pure vitamin added in range of 25-100 γ to condensed fish solubles was recovered from 92.5 to 104.5%. The Rudkin and Taylor method may not differentiate between cobalamin and pseudocobalamin.

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7.641 EXTRACTION PROCEDURE AND DETERMINATION OF THE VITAMIN B_{12} CONTENT OF SOME ANIMAL LIVERS

Shenoy, K. G. and Ramasarma, G. B.
Archives of Biochemistry and Biophysics 51, No. 2, 371-378 (August 1954)

The purpose of the authors was to devise a vitamin B_{12} assay which included a suitable means of releasing the vitamin B_{12}-active compounds from the tissue and of stabilizing the released vitamin. The assay used for the studies was a turbidimetric adaptation of the U.S.P. XIV microbiological assay. A study using a number of methods of extraction recommended in the literature showed that more vitamin B_{12} was released on digestion with pancreatic extract at 50° for one hour than by other methods. Papain was shown to be as effective an enzyme as the pancreatin. In addition, papain had the advantage that it did not introduce an enzyme blank. The authors also confirmed that both sodium metabisulfite and potassium cyanide had a stabilizing action.

The recommended extraction procedure is as follows: Heat 1 g. of liver homogenate with 50 ml. of water and 0.5 ml. of 0.5% aqueous suspension of crude papain at 60° for 1 hour. Add 1 ml. of a fresh 5 percent solution of sodium metabisulfite and steam for 5 min. The extract is cooled, diluted to 100 ml. and filtered.

Results are reported of assays of the vitamin B_{12} activity of the livers of the cow, buffalo, sheep, goat, pig, rabbit, chicken, rat and mouse. The results of both the alkali-labile and alkali-stable activity are compared with the results in the literature.

Twenty-seven references are cited.

 ABSTRACTER: Neva L. Karrick

DETERMINATION OF TOTAL SOLIDS IN FISH

DETERMINATION OF VITAMIN B_{12}

DETERMINATION OF TOTAL SOLIDS IN OYSTERS

VITAMIN B_{12} ASSAY

7.43 (Cross Reference: 7.53)

complete dryness is obtained by the steam bath, together with adequate stirring, results will be satisfactory regardless of the type of oven. The forced draft oven will save time. There is no advantage in a vacuum oven over a simple air oven.

Ether Extract

The collaborative samples used were pink salmon with approximately 7 percent fat and chinook salmon with about 10 percent fat. Each collaborator determined ether extract by the official method and by the following method: Weigh five g. of ground and mixed sample into a 250-ml. centrifuge bottle. Add 10 ml. of Ottawa sand (predominantly 20-mesh), 10 ml. of anhydrous sodium sulfate, 25. ml. of ethyl ether, and 25 ml. of petroleum ether. Stopper and shake vigorously by hand 1 minute to break up and disperse solids. Shake 30 minutes in a mechanical shaker. Centrifuge to form tight cake under ether (ca 10 minutes at 1200 r.p.m.), and carefully pipet 20 ml. of clear ether layer into tared 50-ml. beaker. Evaporate to dryness on a steam bath, using a stream of air to prevent bumping. Heat 15 to 20 minutes in an air oven at 100°, then cool in air and weigh. Calculate, using the following formula which corrects for the volume of fat in the aliquot: $\%\ \text{fat} = \frac{W\ (50)\ (100)}{\left(20 - \frac{W}{0.92}\right)\ (S)}$ where W = wt. of fat in aliquot; 50 = ml. of solvent used; 20 = ml. of aliquot; 0.92 = sp. gr. of salmon oil; and S = wt. of sample.

All collaborators except one obtained significantly higher results by this method. No particular difficulty with its use was reported. Some collaborators commented favorably on the method, particularly on the saving of time.

It is recommended that collaborative work on the suggested method be continued and that the method be extended to fish other than salmon.

7.43 (Cross Reference: 1.81)

The recommendation was also made that further study be conducted to attempt to decrease the time necessary for the determination of solids in oysters and that these studies be in line with the recommendations made by Subcommittee C.

4.11 FATTY ACID COMPOSITION OF FISH OILS. III. SOCKEYE SALMON OFFAL OIL

Swain, Lyle A.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 99, 6-8 (July 1954)

The oils analyzed for fatty acid composition and reported upon in this paper were obtained in the summer of 1952 and 1953 from sockeye salmon (Oncorhynchus nerka) cannery offal. The fish from which the oils were obtained had been caught in the Fraser River and the Gulf of Georgia. The 1953 offal contained, in addition to that of sockeye salmon, 10% of chum and pink salmon offal.

The acid values of the 1952 and 1953 oils as received were, respectively, 4.0 and 1.9. Both oils were alkali-refined and then converted in 500-gram lots, as needed, into their methyl esters. The esters were fractionated by crystallization from their acetone solutions at low temperatures. In an alternate method of fractionating the methyl esters, a sample of the 1952 oil was separated into four fractions from an acetone solution of these esters by the addition of increasing amounts of water and chilling each time to -30° F.

Each of the methyl ester fractions, regardless of the method of preparation, was then molecularly distilled at low pressure (5 to 15 mμ or about 0.01 mm. mercury) and moderately low temperature not exceeding 176° F. Two properties were determined on each of the small portions of distillate collected: (1) unsaturation (by iodine value) and (2) size of the molecules present (by saponification equivalent). The weight of each kind of fatty acid present in each portion was calculated from these data. The sum of these weights showed the amount of each fatty acid that was present. From the results shown in table 1 (this card, over) it is evident that the 1952 and 1953 oils are not identical in composition. The highly unsaturated fraction soluble in dilute solution (5%) acetone at -105° F. contained almost 40% of the total fatty acids. About half of these acids were composed of C_{20} to C_{24}

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 ABSTRACTER: Martin Heerdt

4.13 THE COMPONENT ACIDS OF THE FATS OF SOME INDIAN FRESH-WATER FISHES

Pathak, S. P.; Pande, G. D.; and Mathur, S. S.
Biochemical Journal 57, No. 3, 449-453 (July 1954)

The authors determined the fatty acid composition of the body and visceral fats from rohu (Labeo rohita) and nain (Cirrhina mrigala). A preliminary separation of the fatty acids into groups of differing unsaturation was made as follows: The fats were hydrolyzed and the mixed fatty acids were resolved into groups of simpler mixtures by the lithium salt-acetone method of Tsujimoto (1920) and Tsujimoto and Kimura (1923). This fractionation was followed by further resolution of the insoluble fraction by the lead salt-ethanol method as modified by Hilditch (1949). Each group of acids was then separately converted into methyl esters and fractionated at approximately 0.1 mm. pressure through an electrically heated, packed column or a molecular still. The composition of the various ester fractions was calculated from the iodine values and the saponification equivalent.

Rohu and nain do not belong in the same genus. Significant differences were found in the proportion and degree of unsaturation of their respective C_{16}, C_{18}, C_{20}, and C_{22} groups of unsaturated acids; in the amounts of their total saturated acids; and in the amounts of their stearic acid.

In rohu, the composition of the body fat was somewhat different from that of visceral fat in both the saturated and unsaturated fractions (tables 2, and 3, omitted). Unsaturated C_{24} acids were absent. The most unusual feature of rohu body and visceral fat was its high saturated acid content, 36.6 and 45.3%, respectively. The quantity of stearic acid, 11.5% in the body fat and 14.6% in the visceral fat, is even more unusual. This large quanity of stearic acid suggests that an otherwise normal fish fat has been subjected to biohydrogenation that has resulted in larger amounts of stearic

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 ABSTRACTER: Martin Heerdt

4.61 THE PROTECTION METHOD OF MARINE PRODUCTS FROM THEIR DETERIORATION DUE TO THE OXIDATION OF OIL

Saruya, Kuman; Toyama, Kenzo; Ando, Kazuo; and Shigemiya, Haruo
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 1, 58-88 (1954) (English summary and tables)

I. Applicability of antioxidant to salted and dried saury

"Thawed samples of saury were split, salted and used for the test. The antioxidants used were B.H.A. (butylated hydroxyanisol, B.H.A. + synergist, N.D.G.A. (nordihydroguaiaretic acid), N.D.G.A. + synergist, ethyl protocatechaute, vitamin C, and pix liquida in the form of 0.005%, 0.010%, 0.025%, and 0.050% solutions, respectively, which were prepared in 12% NaCl solution. After salting for 16 hours in the curing solutions mentioned above, they were dried in the daylight, wrapped with paper, and stored at room temperature."

II. Relative efficacy of some antioxidants applied to salted and dried saury

"B.H.A. was found to be most recommendable in the case of salted and dried saury. B.H.A. + synergist, N.D.G.A., N.D.G.A. + synergist, and ethyl protocatechaute were also effective but tended to be accompanied by red or brown colour development. Vitamin C and pix liquida proved to be but of little efficacy."

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4.29 SOUTH AFRICAN PILCHARD OIL. 2. CONCENTRATES OF HIGHLY UNSATURATED FATTY ACIDS AND ALCOHOLS DERIVED FROM SOUTH AFRICAN PILCHARD OIL

Silk, M. H.; Sephton, H. H.; and Hahn, H. H.
Biochemical Journal 57, No. 4, 574-77 (August 1954)

Concentrates of highly unsaturated fatty acids have been prepared by applying lithium soap-acetone fractionation and urea complex fractionation to the total acids from the body oil of the South African pilchard. Urea complex fractionation has also been applied to the unsaturated acid concentrate obtained by the lithium soap-acetone procedure.

The alcohols obtained by lithium aluminum hydride reduction of pilchard glycerides have also been fractionated by the urea complex method.

It was found that the lithium soap-acetone method gave an unsaturated acid concentrate which had an equivalent weight of 311 and an average value of 4.62 double bonds per molecule. On the other hand, the urea complex method gave an unsaturated concentrate whose equivalent weight was 304 and which had an average value of 4.89 double bonds per molecule. Thus it appears that the urea method gives a concentrate of higher degree of unsaturation but with a high content of fatty acids with C_{16} and C_{18} double bonds. The lithium soap-acetone method yields a concentrate with less unsaturation but richer in the longer chain C_{20} and C_{22} unsaturated acids.

When the urea method was applied to the concentrate from the lithium soap-acetone method it was found that a highly unsaturated concentrate with a high content of longer chain fatty acids was obtained.

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 ABSTRACTER: W. N. Sumerwell

FATTY ACIDS OF SALMON OFFAL OIL

ANTIOXIDANTS

FAT COMPOSITION OF INDIAN FISHES

FATTY ACIDS FROM PILCHARD OIL

4.61

III. The permeation of B.H.A. on its application in several ways to fish. I.

"The authors measured the actual permeation of B.H.A. in fish when soaking the fish in fresh water containing B.H.A.; soaking the fish in saturated salt solution containing B.H.A.; salting the fish with dry salt added with B.H.A.; and drying the fish after boiling in salt solution containing B.H.A."

4.29

The application of the urea method to pilchard fatty alcohols gave an unsaturated concentrate with an iodine value of 365 and representing 30% of the weight of fatty alcohols in the original sample.

4.11

fatty acids according to table 2 (this card, below). In both salmon oil and herring oil the long chain fatty acids were similar in proportion. These fatty acids contained as many as 6 double bonds if obtained from salmon oil and 4 double bonds if obtained from herring oil.

TABLE I.—Fatty acid composition of oil from sockeye salmon cannery offal (1% by weight)

Sample \ Carbon atoms per molecule	Saturated					Mono-Unsaturated					Unsaturated*				
	14	16	18	20	22	14	16	18	20	22	16	18	20	22	24
A. 1952 Production (iodine value 143; saponification equivalent 309.5; unsaponifiable matter 0.9%)															
1†	1.9	10.4	4.8	0.6	—	0.5	9.3	2.4	0.1	—	5.8	24.2	25.0	14.6	0.2
3	1.2	14.6	4.4	1.3	—	0.2	2.8	4.5	1.6	—	2.3	24.3	27.7	13.8	1.2
5	1.2	13.4	6.3	0.2	—	0.1	2.5	3.7	0.9	—	2.2	24.5	30.2	14.7	—
7	1.9	14.5	4.9	0.4	tr.	0.1	3.5	8.1	2.3	0.5	3.0	22.5	28.7	11.4	tr.
B. 1953 Production (iodine value 146; saponification equivalent 302; unsaponifiable matter 0.75%)															
1	1.6	14.4	7.4	0.4	—	0.2	3.7	5.4	1.6	—	2.8	25.6	25.9	10.0	0.9
2	1.2	14.2	4.9	1.0	0.1	0.1	3.2	5.4	5.6	3.1	3.6	23.7	22.5	11.2	0.2

TABLE II.—Fatty acids (as % by wt. of total fatty acids) present in readily soluble fraction of methyl esters of oil from sockeye salmon cannery offal.

Sample \ Carbon atoms per molecule	16	18	20	22	24	Total
A. 1952 Production						
1†	2.1 (1.8)‡	8.0 (4.0)	9.3 (7.6)	2.8 (7.6)	—	22.2
3	2.0 (2.8)	16.7 (4.8)	15.9 (7.0)	7.1 (12.1)	1.2 (10.6)	42.9
5	1.9 (3.1)	12.7 (4.4)	14.9 (6.1)	6.7 (11.6)	—	36.2
7	2.9 (0.8)	12.5 (6.1)	17.1 (8.4)	4.4 (10.1)	—	36.9
B. 1953 Production						
1	2.5 (2.0)	16.4 (4.6)	15.2 (8.9)	4.5 (11.2)	0.5 (10.6)	39.1
2	3.4 (3.1)	13.4 (4.3)	13.8 (7.9)	7.6 (10.1)	0.2 (9.6)	38.4

* Some portion of mono-unsaturated acids is present in these fractions.
† In this sample esters were separated at −30°F. (−22°C.) from acetone solutions by adding increasing proportions of water.
‡ The number in parentheses represents the deficiency of hydrogen atoms per molecule of fatty acid.

4.13

acid at the expense of unsaturated C_{18} acids and an increase in the total amount of saturated acid, especially in fats from rohu. Small differences in the composition of the fats from the body and viscera of the same fish were found in both species. The viscera of both of these fish contained an average of 45% fat.

6.3

OBSERVATIONS ON THE CARBOHYDRASE ACTIVITY OF CERTAIN SEAWEED EXTRACTS

Duncan, W. A. M.; Manners, D. J.; and Ross, A. G. (Dept. of Chemistry, University of Edinburgh)
Biochemical Journal 57, No. 3, xviii (July 1954)

Dilute solutions of proteins showing hydrolytic activity towards carbohydrates were obtained from minced Cladophora rupestris, Laminaria digitata, and Rhodymenia palmata by extraction under weakly alkaline conditions. These carbohydrases were concentrated by precipitation with ammonium sulfate and freeze-dried. Whole extracts from the three seaweeds were found to hydrolyze certain α-glucosides (maltose, sucrose, $\alpha\alpha$-trehalose); several β-glucosides [cellobiose, cellodextrin (an acid-degraded cellulose), laminaribiose, laminarin, barley β-glucosan, methyl β-glycoside, phenyl β-glucoside, amygdalin and salicin]; lactose; xylotriose; and the xylans from Esparto grass and R. palmata. The whole extracts, however, did not hydrolyze methyl α-glucoside, methyl α-galactoside, methyl α-mannoside, soluble starch, fucoidin, and inulin. Partial separation of the various hydrolytic activities of seaweed extracts has been obtained by fractionation with ammonium sulfate.

Seaweed maltase showed both hydrolytic and synthetic activity, and on maltose it produced glucose and small amounts of maltotriose and maltotetraose. This activity was at an optimum at pH 5.5 and was not affected by inorganic phosphate. The hydrolysis of laminarin with a seaweed extract produced glucose and a series of oligosaccharides. The oligosaccharides were hydrolyzed on prolonged incubation, to glucose. The hydrolysis of cellodextrin with a seaweed extract yielded glucose and cellobiose. This cellobiose was eventually hydrolyzed to glucose. It appears, therefore, that the seaweed extracts contain (1) a group specific β-glucosidase which can only hydrolyze terminal β-linked glucose units, and (2) a β-glucosidase capable of hydrolyzing non-terminal β-glucosidic linkages. Unlike emulsin, the seaweed β-glucosidases do not show synthetic activity, but they do have a laminarinase

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 ABSTRACTER: Martin Heerdt

6.193

THE NUTRITIVE VALUE OF FISH MEAL AND CONDENSED FISH SOLUBLES. VIII. INTERACTION BETWEEN UNIDENTIFIED FACTORS IN HERRING MEAL AND IN DEHYDRATED GREEN FEED

March, B. E.; Biely, Jacob; and Tarr, H. L. A.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 99, 12-13 (July 1954)

Two unidentified factors which stimulate chick growth have been found -- one in fish meal and one in dehydrated green feed (DGF) -- by several groups of investigators working independently.

The following experiments were carried out to study the possibility of interaction between the two factors. British Columbia herring meal and DGF samples A and B were added to a basal synthetic diet as sources of unidentified factors. The composition of the basal diet fed appears in a footnote to a table showing average weights of chicks in grams (this card, over). This basal diet contained adequate amounts of all of the known vitamins and minerals required by chicks. The effect of vitamin C when added at the rate of 45 grams (about 0.4 lb.) per 100 lbs. of ration was determined with and without herring meal and DGF, or both.

In test 1, New Hampshire pullet chicks were fed the basal diet for one week and then distributed on the basis of weight into lots of 17 birds each. In test 2, New Hampshire cockerel chicks were fed the basal diet for 10 days and then distributed on a weight basis into lots of 15 birds each. The average weights of the chicks at the termination of these tests appear in the aforementioned table. In test 1, neither DGF (sample A) nor herring meal when fed alone stimulated growth, whereas a slight response in growth did occur when DGF (sample B) was added to the basal diet. In diets supplemented with DGF, the addition of herring meal produced chicks that were heavier at the end of 33 days than

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 ABSTRACTER: Martin Heerdt

6.183

LOW PROTEIN DIETS FOR THE TURKEY POULT

Baldini, James R. and Rosenberg, Hans R.
Poultry Science 33, No. 5, 1041 (September 1954)

It has been demonstrated that Jersey Buff turkey poults in battery brooders to six weeks grow well on a 20% protein corn-soybean diet supplemented with synthetic L-lysine, HCl and DL-methionine. Additional experiments of similar nature have shown that poults also do well on low protein diets of the complete type containing various sources of the unknown factors necessary for optimal poult growth. Lower, more economical levels of the amino acids than have been tried previously have been used with success, especially in 22% protein diets. Low levels of both lysine and methionine have beneficial effects at the 28% protein level as well.

Synthetic amino acids have again been shown to have an important role in the conservation of scarce protein for animal feeding. Previous work on a highly experimental basis is now approaching the practical and economical realm. A 22% protein diet based on corn and soybean oil meal containing 2% each of brewers' yeast, distillers' solubles, whey product, alfalfa meal, 3% fish meal with solubles and 0.05% each of lysine and methionine has been fed. Growth and feed efficiency were as good as that obtained on a standard turkey starter containing 28% protein and large amounts of materials containing the unidentified factors.

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6.3

THE UTILIZATION OF CARBOHYDRATES OF SEAWEED BY RUMEN MICROFLORA IN VITRO

McNaught, M. L.; Smith, J. A. B.; and Black, W. A. P.
Journal of the Science of Food and Agriculture 5, No. 7, 350-352 (July 1954)

It has been customary in some countries to include small quantities of seaweed in cattle rations. One of the seaweeds found in quantities in British waters is the brown alga (Laminaria cloustoni). Since much work is now being done in Britain on the composition and nutritive value of seaweeds, it was decided to test laminarin, fucoidin and L-fucose to determine if the mixed flora of cattle rumen can utilize these substances. Specifically, it was desired to know to what extent protein synthesis from N.P.N. predominates over protein breakdown when the foregoing substances are incubated at 30° C. with rumen liquid. The authors also attempted to determine if the flora of the cattle rumen can utilize the carbohydrates present in the following dried and milled seaweeds: (1) the fronds and (2) the stipes of Laminaria cloustoni and (3) the entire plant Ascophyllum nodosum.

Most of the protozoa were removed from the fresh rumen liquid by light centrifugation before incubation began. Then urea (0.05%) was added to all samples of rumen liquid to insure that bacterial activity would not be limited by a lack of N.P.N. The carbohydrates and the dried milled seaweeds were added at a level of 1%, and incubation was carried out for 4 hours at 39° C. Protein synthesis was used as a measure of bacterial activity and any increase in acidity as an indication of rapid carbohydrate utilization.

Appropriate amounts of laminarin, fucoidin and L-fucose were dissolved in water and added to the rumen liquid. When dried milled seaweeds themselves were used, the desired amount of the seaweed was put into an incubation flask with cold water and the mixture was allowed to stand for 15 to 45

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 ABSTRACTER: Martin Heerdt

CARBOHYDRASE ACTIVITY OF SEAWEED EXTRACTS

FISH MEAL IN TURKEY POULT DIETS

GROWTH FACTORS IN HERRING MEAL

SEAWEED IN CATTLE RATIONS

6.3

minutes to insure thorough wetting of the seaweed. Rumen liquid with 0.05% urea was then added to the cold flasks and the contents were thoroughly mixed. A control flask with rumen liquid containing 1% of maltose was included in all experiments. In other experiments a flask containing rumen liquid to which no carbohydrates had been added was included as a control. The findings are summarized in tabular form.

Laminarin was utilized by the rumen microflora; however, it did not result in as great a synthesis of protein as maltose. Fucoidin and L-fucose were not utilized by the rumen microflora, perhaps because of the presence of some toxic substance. If fucose was tested in the presence of maltose, however, the utilization of maltose did not diminish. This would indicate that something in the structure of fucose mitigates against its utilization.

The frond of Laminaria cloustoni was utilized by rumen microflora to the same extent as was maltose. The stipe of Laminaria cloustoni, however, did not give rise to protein synthesis, although it did not prevent the utilization of maltose. Ascophyllum nodosum was not utilized by the rumen microflora, but if incubated in the presence of maltose, it reduced the rumen activity compared with that obtained with maltose alone.

According to the findings, laminarin, which is present in the frond but not in the stipe of Laminaria cloustoni, and which is present in only very low concentrations in Ascophyllum nodosum, is the only constituent of these two species of the algae tested that is readily utilized by rumen bacteria. In summary, only laminarin is readily and rapidly utilized under the same conditions that starch and maltose are utilized.

6.3

activity that is maximal at about pH 5.1.

The seaweed extracts also showed marked xylanase activity that was not affected by inorganic phosphate. Xylose, xylobiose, xylotriose and higher saccharides were produced from the xylans of Esparto grass or Rhodymentia palmata. These findings seem to indicate that 1:3 linkages in algal xylans are more easily hydrolyzed than 1:4 linkages.

6.193

those fed the basal diet supplemented with DGF alone. In test 2, the chicks responded to both DGF (A and B) and to herring meal when each was added singly. In diets already supplemented with DGF the rate of growth was greater with added herring meal than with either herring meal or DGF alone. The addition of vitamin C at the rate of 45 g. per 100 lbs. of ration to diets that did not contain herring meal (test 1) depressed the growth of chicks, whereas the addition of vitamin C to the diets supplemented with herring meal stimulated growth. The response of the chicks to DGF was not apparent when the diet contained vitamin C, regardless of the presence or absence of herring meal in the diet.

Average weights of chicks in grams

Supplement	Basal ration alone		Basal ration+herring meal		% Increase in weight due to herring meal
Test 1 (17 chicks per lot)	7 days*	33 days	7 days*	33 days	
None	85	424	85	412	-3
DGF "A"	86	437	84	484	11
DGF "B"	85	418	85	439	5
Ascorbic acid	86	414	84	437	6
Ascorbic acid + DGF "A"	84	403	84	432	7
Ascorbic acid + DGF "B"	84	406	85	447	10
Test 2 (15 chicks per lot)	10 days*	31 days	10 days*	31 days	
None	64	311	63	326	5
DGF "A"	63	354	64	375	6
DGF "B"	63	338	63	374	11

* Standardized on a weight basis.

The composition of the basal diet was as follows. (Pounds per 100 pounds): Cerelose 63.89, Drackett protein 25.0, *dl*-methionine 0.4, bonemeal 4.0, manganese sulphate 0.0125, feeding oil (2250 I.U. vitamin A, 300 I.C.U. vitamin D) 0.25, corn oil 3.0, ground cellulose 2.0, iodized salt 0.5, potassium chloride 0.8, choline chloride 0.15 lb.; (grams per 100 pounds): niacin 2.27, calcium pantothenate 0.908, riboflavin 0.363, thiamin hydrochloride 0.454, pyridoxine hydrochloride 0.227, inositol 45.4, *p*-amino benzoic acid 4.54, folic acid 0.0908, menadione 0.0508, vitamin B_{12} 0.0023, biotin 0.0091, alpha tocopherol acetate 0.15, ferric citrate 5.0, copper sulphate 0.5, nickel carbonate 0.025, cobalt acetate 0.05, zinc acetate 0.25. Herring meal was added at the rate of 2% and DGF at the 5% level. Adjustments were made in the levels of Drackett protein, cerelose and cellulose to maintain the protein, energy and fibre at constant levels in all diets.

3.230 FISH AND REFRIGERATION

LeGall, J.
Rev. gen. Froid 27, 673-689 (1950)
Food Science Abstracts 26, No. 5, 509 (September 1954)

The effect of refrigeration on fish spoilage bacteria and on enzymes, and the effect of freezing on fish muscle tissues are discussed. The uses of different types of ice (including chemically treated ice), brines, and dry ice are considered. Methods of quick-freezing in air or in brine, and by direct contact are described and illustrated. An account is given of methods of transporting and storing frozen fish, and of changes (denaturation of proteins, rancidity) which may occur in frozen fish during storage, as well as of the retail marketing of frozen fish. Chilling with ice can preserve fish for 2 weeks at most, and the keeping quality of quick-frozen fish depends upon the nature of the fish (lean or fat), the care taken in freezing, and the proper storage conditions. The sooner the fish are frozen, preferably at the fishing grounds, the better is their quality.

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9.4 GREAT LAKES AGREEMENT

Anonymous
Trade News (Fisheries Department, Canada) 7, No. 3, 3, 11 (September 1954)

An international fisheries agreement providing for joint action in Great Lakes fishery research and in the elimination of the predatory sea lamprey in these waters was signed in Washington, D. C. recently by representatives of the United States and Canada.

The Great Lakes Convention, as it is officially named, will become effective upon ratification by both countries, and will have an initial duration of ten years. It provides for the establishment of a Great Lakes Fishery Commission to be made up of three appointees from each country.

Duties of the Commission include the formulation of research programs regarding the Great Lakes fisheries and the formulation and implementation of comprehensive programs for destruction of the sea lamprey. The Commission will have no regulatory powers, but will recommend to the Governments, on the basis of research findings, measures to make possible the maximum sustained yield of the Great Lakes fisheries. In order to carry out its duties the Commission may conduct investigations, hold public hearings, and in addition to taking remedial measures may also install devices in the Convention area and adjoining tributaries for lamprey contol.

The Convention area includes, in addition to the Great Lakes and their connecting waters, the St. Lawrence River from Lake Ontario to the 45th parallel, Lake St. Clair, and tributaries of these waters to the extent necessary to investigate any stock of fish of common concern.

ABSTRACTER: Roy C. Stevens

3.33 INTERNAL VACUUM IN CANS

Kefford, J. F.
Food Preservation Quarterly 14, No. 1, 8-18 (March 1954)

A vacuum is created within food cans in order to collapse the can, to minimize strains in processing, and to control internal chemical activity. Practically all cases of microbial spoilage except those due to flat-sour organisms are exhibited by swelled or springy cans. Thus a good indication of the condition of food within a can is the amount of vacuum in the headspace.

Several instruments for measuring the internal vacuum of cans are described in some detail. For accurate measurements a mercury manometer such as the Campden manometer is used. When more robust and portable instruments are needed for routine measurements, a vacuum gauge of the Bourdon type is most satisfactory. Several methods are available for estimating vacuums in unopened cans.

A list of 27 references is given on determining vacuums in canned food products.

ABSTRACTER: Geo. M. Pigott

3.13 OZONE GENERATOR CAN RETARD ODORS AND MOLDS IN REFRIGERATED WAREHOUSES

Anonymous
Frosted Food Field XIX, No. 4, 32 (October 1954)

Ozone generators have come into use as a means of helping to prevent mold growth and to eliminate odors in cold storage. Ozone-charged air retards mold growth because it destroys the bacteria that create molds. It will not remove mold accumulation, but will retard the action of old bacteria in the creation of new molds.

The elimination of odors depends upon the nature of the odors and the amount of ozone generated and available for oxidation. Food odors and others of organic origin can be effectively eliminated by the use of well-placed ozone generators.

The cost of operating a generator is said to compare favorably with that of burning a standard size electric light bulb. When such a unit is purchased, the size of the space it is intended to purify should be carefully considered. Too large a unit manufacturing excessive amounts of ozone can cause respiratory irritation, whereas too small a unit will not satisfactorily do the job for which it is intended.

Manufacturers caution that no attempt should be made to neutralize odors instantly, but rather that the machine should be run at a low level for long continuous periods of time. The amount of ozone manufactured should not exceed 1/2 of one part per million parts of air. Because ozone is heavier than air, ozone generators should be placed high and in a central location so that the ozone will diffuse the air of the room equally.

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ABSTRACTER: Roy C. Stevens

REFRIGERATION OF FISH

VACUUM MEASUREMENT

GREAT LAKES FISHERIES CONVENTION

OZONE IN REFRIGERATED STORAGE

3.33 (Cross Reference: 0.118)

3.13 (Cross Reference: 3.24)

Ozone generators are also being used effectively in retail display cases.

2.115 GLASS FIBER MOULDED BOATS

Anonymous
U. S. Department of the Interior, Fish and Wildlife Service, Fishery Products Report S-206, Seattle, Washington, October 22, 1954

A British firm has successfully developed a boat built of a material which is impervious to worms and rot. The new material used for a seagoing launch is polyester resin and fiber glass. The cost of the hull is approximately the same as that of one made of wood but outstanding advantages of hulls built of the new material (glass fibers impregnated with plastic resin) are: low initial cost; a big saving in maintenance cost, particularly in warm or tropical waters; great strength; durability; rapid and inexpensive repair. The hulls made of these impregnated plastic resin glass fibers (a) do not have to be repainted (color is impregnated right through the hull at the time when it is built); (b) cannot be attacked by marine insects; (c) cannot suffer from dry rot; (d) cannot leak or open up at the seams because there are none; (e) cannot rust or corrode like steel or aluminum; (f) do not grow heavier by absorbing water. Once a mould has been made, a 26-foot hull can be completed in seven working days and a 45-foot hull in fifteen working days, an August 25 United States Embassy dispatch from London reports.

An article in the August 20 issue of the Fishing News, a British fishery periodical, points out that "it may be possible to evolve standard-size lifeboats. Tests along these lines are already being made and negotiations are on foot with Lloyd's regarding tests, etc. As experience grows it may be possible to evolve standard types of inshore vessels which will possibly reduce the cost of replacements to the fishing industry. The matter of abrasion on sandy beaches has yet to be tested."

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2.115 LIVE BAIT EQUIPMENT

Carlson, C. B.
Pan American Fisherman 9, No. 4, 11 (November 1954)

Facilities for holding live bait aboard pole-and-line tuna vessels may vary from a tank of non-circulating sea water, as used in the Cuban fishery, to the elaborate system employed aboard U. S. Pacific tuna clippers. In the Hawaiian fishery live bait wells are built in the hull and are fitted with screened holes below the water line to allow the entrance and exit of sea water. Such wells are capable of keeping bait alive for several weeks.

Bait-holding facilities aboard the large U. S. Pacific tuna clippers are quite elaborate. Bait tanks must be so constructed that they are capable of supporting the weight of water under any condition of service at sea. The amount of bait that can be carried in a tank of given volume is probably dependent on several factors including oxygen content, temperature, salinity of the water, etc. A typical vessel described by the author carried 300 and 400 scoops of bait (each scoop containing about 12 pounds) in deck tanks having a capacity of 4,100 and 6,130 gallons, respectively, exclusive of baffle and screen areas.

The design of screens in the bait tanks is very important. Typical screens are made of 3/4-inch waterproof marine plywood with 1/8-inch slots cut by a circular saw on one-inch centers. The deck bait tanks are of a general rectangular form to fit the available space, but the below deck tanks are vertical on three sides with the fourth side and bottom conforming to the shape of the hull.

Sea water is supplied to the tanks by vertical-impeller type pumps designed to deliver large volumes at low head pressures. The performance capacity of the pumps should be sufficient to change

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 ABSTRACTER: Roy C. Stevens

6.135 AIR POLLUTION CONTROL SYSTEM

Anonymous
Fishing Gazette 71, No. 10, 54B (October 1954)

Air pollution control is one of the most important and most difficult problems confronting a fish reduction plant operator. The present article describes a three-way air pollution control system operating on the closed system principle designed to (1) recover "fines" and dust, (2) condense objectionable water-soluble vapors, and (3) treat noxious insoluble fumes by recycling them through the dryer furnace and burning them in a separate incinerator.

In the plant described the drying gases and vapors are discharged into a 60-foot-high condensing tower where they pass through a spray of cool sea water to condense the steam. As the vapors are condensed they are thrown by centrifugal action against the inner walls of the tower and are mixed with the cooling water. About 5,000 gallons of sea water per minute are pumped through the tower. The remaining cool air is drawn into a fan driven by a 75-h. p. motor and recycled back into the furnace where it is reheated, starting a new drying cycle through the dryer. To provide sufficient oxygen for combustion in the furnace, approximately 25 percent of the deoxygenated air is bled off and replaced by fresh air. The air that is bled off passes through the hottest zone in the furnace and into a large separately oil-fired stack incinerator. This incinerator is approximately 12 feet in diameter at the bottom and 100 feet high. It is lined with some 243,000 pounds of insulation and refractory materials. It is built of steel and is self-supporting.

The stack incinerator is connected to the main furnace by a duct 12 feet high and 6 feet wide. The amount of air being bled out is regulated by a 7-ton rotating damper of steel and brick which can be operated automatically. The stack is connected to the system by another recycle exhaust duct.

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 ABSTRACTER: Roy C. Stevens

2.1121 HOW DRUM TRAWL MECHANIZES STERN-SET DRAGGING

Anonymous
Pacific Fisherman 52, No. 12, 25-27 (November 1954)

Two Seattle trawlers have recently been outfitted with a new type of gear that is said to permit fishing a bigger net, with less effort, perhaps with fewer men, and in almost any weather. The vessels will be trying the equipment in the Florida shrimp fisheries during the coming months.

In appearance, the hauling gear resembles a small purse seine drum. Actually, there are two drums on one axis, the wide main drum and another of the same diameter, but only about eight inches in width. The narrow drum is used for hauling the try-net and also for lifting the cod-end aboard. The speed of the try-net drum can be controlled within a range of 50 to 700 feet per minute.

The drum trawl gear is designed so that when the doors are brought up to the A-frames the net is unshackled and hooked to the drum. The wings of the net are then run onto the drum. As the bag comes aboard, the cod-end is picked up in the conventional manner and hoisted in over the starboard side. The writer emphasizes that the trawl drum is used strictly for handling the trawl net and is used in addition to the trawl winch. Both vessels are equipped with hydraulic drive for the drums, and are designed with four speeds in either forward or reverse at any engine setting. This permits rapid operation of the gear while supplying sufficient power for heavy loads.

The equipment includes specially designed trawl doors that differ from the usual in their construction, attachment of fittings and provision for adjustment.

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 ABSTRACTER: Roy C. Stevens

GLASS FIBER MOULDED BOATS

AIR POLLUTION CONTROL SYSTEM

LIVE BAIT EQUIPMENT

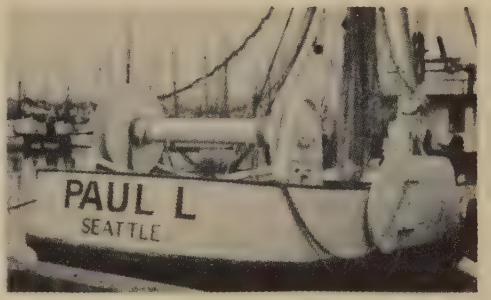
TRAWL DRUM

6.135

Stack temperature is controlled thermostatically and the damper in the flue duct is regulated by an automatic pressure cylinder which maintains the required suction in the furnace.

The entire system is thus a closed one with no visible vapors and, so far as can be determined, no odors at all are being discharged into the atmosphere.

2.1121



2.115 (Cross Reference: 1.1)

the water of the tanks 5 to 7 times per hour.

Methods of taking bait are also described.

7.51 A PROPOSED METHOD FOR ESTIMATING THE AMOUNT OF SOLUBLES ADDED TO WHOLE FISH MEAL -- T.N. NO. 30

Lee, Charles F.
Commercial Fisheries Review 16, No. 9, 21-23 (September 1954)

Increases in imports as well as U. S. interest in whole meals emphasizes the need for a means of estimating the amount of fish solubles added to such mixtures. Generally, basal meal and added solubles are very similar in proximate composition on a dry basis. Distinction between whole and regular meals is commonly based on the greater quantity of hot-water-soluble protein in the former. A minimum of 20 percent of the total protein should be soluble, according to a tentative standard suggested for whole meals. To determine whether this proportion of water-soluble-prbtein to total protein was indicative of the amount of added solubles solids, the soluble protein to total protein proportion was determined for regular menhaden meals, condensed and pure dried menhaden solubles, and some special mixtures of menhaden meals and solubles.

Ten percent, on the average, of the total protein of the regular meals was soluble in water, while the protein of solubles was not completely soluble, averaging 85 percent. Thus the direct proportion of soluble protein to total protein was a poor indication of amount of added solubles solids in a whole meal mixture.

An improved estimate can be obtained by use of a simple formula embodying these data. The percentage of added solubles solids, $X = 1.33C - 13.3$, where C is the percentage of the total protein soluble in hot water as determined by analysis. The general form of the equation $X = \frac{100\,(C-A)}{B-A}$ where A and B are the average percentage of total protein soluble in hot water for the specific basal meal and solubles, respectively, in any whole meal mixture, would give closer

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 ABSTRACTER: Charles F. Lee

8.50 GREEN MEAT OF SWORDFISH

Tsuchiya, Yasuhiko and Tatsukawa, Yoshio
Tohoku Journal of Agricultural Research (Tohoku University, Sendai, Japan) IV, No. 2, 183-187 (February 1954)

The nature of a green discoloration occurring in frozen swordfish is described in a previous abstract (this journal, VII, No. 12, 1). The present article discusses the problem further and describes an experiment in which a water extract of discolored swordfish muscle was prepared and examined spectrophotographically. A maximum absorption band at 620 mμ was identified as that of sulfhemoglobin, a green compound produced by the combination of hydrogen sulfide and hemoglobin in oxygen. Combined with carbon monoxide the substance exhibited a spectrum identical with that of carboxysulfhemoglobin (612 - 618 mμ).

Assuming that hydrogen sulfide-producing bacteria must play an important role in the formation of the green pigment, 23 microorganisms were isolated from fresh and frozen discolored muscle. Four were identified as hydrogen sulfide-producing bacteria. However, attempts to produce the green discoloration by inoculating these bacteria into normal muscle gave no results.

The relationship of sulfhemoglobin to the green discoloration appears to be established by the following findings: (1) The fact that the greatest concentration of green meat occurs on the down side of the fish indicates that it is associated with the decomposition of the congested blood. (2) The optical density of extracts prepared by the same procedure is higher in green meat than in normal meat, and it is therefore assumed that hemoglobin is more concentrated in green meat than in normal meat. (3) Because the green discoloration is concentrated mostly in exposed parts of the body it is postulated that air is necessary for its development. (4) More hydrogen sulfide was found in green meat than in normal meat.

 ABSTRACTER: Roy C. Stevens

8.51 CHEMICAL NATURE OF THE SHARK FIN FIBER

Tsuchiya, Yasuhiko and Nomura, Tadasi
Tohoku Journal of Agricultural Research (Tohoku University, Sendai, Japan) IV, No. 1, 43-53 (October 1953)

Shark fins are an important item in the utilization of East Asian sharks. The horny fibers or ceratotrichia embedded in the shark fin are highly valued as food. Shark fin fiber is commonly used by the Chinese in making a delicious soup.

The authors conducted a number of experiments in an attempt to identify the class to which shark fin fiber protein belongs. The horny fibers used in these experiments were obtained from the great blue shark (Prionace glauca) and the salmon shark (Lamna nasus).

Shark fin fiber is known as a connective tissue that has developed from the mesoderm or middle skin layer, yet differs from keratin, chondrigen, elastin and collagen. The present study indicates that in the following characteristics shark fin fiber is like collagen: (1) The fiber is readily attacked by pepsin but only slightly by pancreatin. (2) The fiber contracts to about 1/3 of its original length if heated to 60-62°C. (3) The fiber is qualitatively similar to the amino acid composition of gelatin; and (4) The staining reaction of shark fin fiber resembles that of Achilles tendon.

The study also indicates that the following characteristics of shark fin fiber are unlike collagen: (1) Prolonged treatment with hot water does not easily convert shark fin fiber into gelatinous matter. (2) If the fiber is stained with Van Gieson's acid in fuchsin-picric acid its color tones differ slightly from those of similarly stained pig tendon. (3) The fiber contains a much higher tyrosine content than gelatin. (4) The fiber has a very fine structure consisting of striations that have a period of about

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 ABSTRACTER: Martin Heerdt

7.53 ANALYTICAL DETERMINATION OF OIL IN FISH MEAL

Anonymous
Southern Fisherman 14, No. 9, 135-136 (September 1954)

The accurate determination of the amount of oil in fish meal has been a surprisingly difficult problem. Usually, if an analytical method gives difficulty, the trouble is caused by the procedure being long and involved. As analytical methods go, however, the determination of oil in fish meal is relatively simple.

The essential features of the method are as follows: a sample of the meal is weighed; it is mixed with a solvent to get the oil into solution; the mixture is filtered to separate the solvent-oil solution from the meal; the solvent is evaporated off; and the oil, which is all that is left, is then weighed. With the weight of the oil and that of the original sample known, the percentage of oil in the meal can easily be calculated.

The difficulty lies in getting the oil into solution. Unless all of the oil is dissolved by the solvent, the results will obviously be in error. Thus, the solvent must be highly efficient. The one that is ordinarily used with animal feeds is ethyl ether. Unfortunately, as was shown in studies by the Fish and Wildlife Service, ethyl ether is not a good solvent for the oil in fish meal. In fact, it was found that, of 16 solvents tried, ethyl ether was among the poorest.

Proof of the inadequacy of ethyl ether as a solvent for extracting the oil from fish meal was strikingly shown with a sample of pilchard meal that had been experimentally prepared in equipment simulating that for commercial wet-rendering. Whereas this sample had yielded an oil content of 14.75 percent when analyzed immediately after being prepared, it yielded only 5.33 percent when

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8.51 (Cross Reference: 1.70)

360 Å in the shadowed fibrils. (5) This fibril seems to be an ellipsoidal ribbon-like structure and fibrilation does not easily occur as in the case of collagen. (6) The striation of shark fin fiber is more complicated than that of collagen and has a double ridge structure.

According to electron micrographs it appears that shark fin fiber is a nearly pure substance. It is a protein of the collagen class that differs from collagen in the relative amount of one amino acid; in amino acid arrangement, and in molecular weight. This protein has been called "elastoidin" by French workers, but the term is inadequate because it means elastin-like. It is recommended that this protein be called "selachin" because the shark fin fiber used in this experiment is a collagen-like substance isolated from Selachii fish fins.

Except for being deficient in tryptophan, selachin contains all of the essential amino acids. It is believed that the commercial value of shark fin fiber is due to the delicacy resulting from the hardness of gelatinization in cooking.

7.53

analyzed 7 1/2 months later. That these results are what can ordinarily be expected was shown in other work in which it was also found that the efficiency of ethyl ether to dissolve the oil steadily decreased as the meal aged. With a very old meal, for example, one-tenth as much oil might be recovered as had been found when the meal was first made.

The variation in analytical results with the age of the meal has been the source of controversy between the sellers of the meal and the buyers. Such controversies have been particularly heated whenever a considerable period has elapsed between the time when the meal was analyzed by the seller and by the buyer. Another unfortunate effect of the erroneous analyses has been that anyone using the data has obtained an untrue estimate as to the nutritional value of the meal. It is for these reasons that the Fish and Wildlife Service has been working to develop a good analytical method.

In the search for efficient solvents for extracting oil from fish meal, acetone was found to be exceptionally good. In addition, it was found that if, after an initial acetone extraction, the meal was digested with hydrochloric acid and then given a second acetone extraction, a further amount of oil could be obtained. The oil obtained in the first acetone extraction plus that obtained in the extraction following the digestion with hydrochloric acid gives the total amount in the meal. This total has been shown to be very close to the true value -- even for meals that have been in storage for several years.

The method has now been adopted (first action) by the Association of Official Agricultural Chemists. The details of the method may be found in paragraph 22.28 in their Official Methods of Analysis, Seventh Edition.

Thus, the method is helping to solve the problems mentioned earlier in this article. That is, it is contributing to a greater uniformity of results in the analytical determinations made by the sellers and the buyers of fish meal. It is also contributing to the modern trend in animal nutrition in which all nutrients in the feed are accurately determined.

7.51 (Cross Reference: 6.15)

estimates, but in most cases these values will not be known. The formula should, however, give a more accurate estimate of added solubles solids in any mixture of this type than will the use of the direct proportion. This conclusion is based on the evident source of the soluble protein in regular meals derived from the limited efficiency of the presses, which leave approximately 50 percent of stickwater wetting the presscake as it enters the dryer.

2.111 GETTING THE MOST FROM MENHADEN SEINES

Robas, John S.
Southern Fisherman 14, No. 10, 93-94 (October 1954)

Tests were conducted to compare the effectiveness of various fish net preservatives both alone and in combination. In an experiment carried out at Peconic Bay, Long Island, three-ply manila twine of approximately 400-lb. strength was treated with various preservatives and exposed for a period of three months. After this exposure the twine samples were subjected to breaking strength tests. Treatments used and results obtained are tabulated below.

Treatment	% Retained Tensile Strength After Exposure
Creosote oil	51
Pine Tar	46
Seine Tar	49
Copper naphthenate	100
Copper naphthenate & cordage oil	100
Copper oleate	100
Copper naphthenate & creosote oil	100
Copper naphthenate & pine tar	100
Copper naphthenate & seine tar	100
Untreated twine control	23

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 ABSTRACTER: Roy C. Stevens

2.12 NORWEGIAN HERRING PURSE-SEINE TESTS PROVE SUCCESSFUL

Anonymous
U. S. Department of the Interior, Fish and Wildlife Service, Fishery Products Report S-214, Seattle, Washington, November 3, 1954

The recent summer cruise of the Norwegian research vessel G. O. Sars in ocean waters between Iceland and Jan Mayen included tests of purse seining for herring in the open sea. Articles in Fiskaren (September 22 and 29), a Norwegian trade publication, in quoting Dr. Finn DeVold (who was in charge of the cruise) and the accompanying purse-seine expert, stated that the tests indicate that purse seining in this area can be carried on profitably on a commercial basis. The catch may be used either for salting on the vessel or for transporting to Norway a couple of days distant for manufacture into herring meal and oil.

Asdic or similar scanning equipment must be used to locate the herring schools as the usual vertical echo-sounding apparatus is not adequate. After locating a herring school with the asdic on the G. O. Sars the seine boat was directed to the school. The boat located the school on its own depth finder before setting the purse seine. The herring were mostly at a depth of 10 fathoms. A purse seine with a depth of 35-40 fathoms was recommended as most suitable. The herring were always found in waters of about 43° to 46° F., suggesting the need for temperature-measuring equipment on the fishing vessels.

Large schools of herring should be found off Iceland in July and off Jan Mayen in August.

The fat content of the herring varied from about 17 percent in mid-July to 24 percent at the end of August, compared with only 7 to 13 percent for Norwegian winter herring. Presumably the Norwegian

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3.249 COLD-STORAGE LIFE OF FRESH-WATER FISH. NO. 1

Miyauchi, D. T. and Stansby, M. E.
Commercial Fisheries Review 16, No. 9, 18-20 (September 1954)

The results of the cold-storage life studies on some species of fresh-water fish are summarized. Collecting samples in the Great Lakes and other areas and shipping them in good condition to the Seattle laboratory greatly limited the scope of the study.

The species of fish listed below were caught in Lake Erie during October and November, 1951. The whole fish were frozen, packed in dry ice, and shipped to Seattle by railway express. At the laboratory, they were ice-glazed, wrapped in moisture- and vapor-proof cellophane, and stored at 0° F. The estimated cold-storage life of the test samples is as follows:

1. Yellow perch (Perca flavescens)	More than 12 months
2. Yellow pike (Stizostedion vitreum)	More than 12 months
3. Blue pike (Stizostedion glaucum)	More than 12 months
4. Whitefish (Coregonus clupeaformis)	9 months
5. Sheepshead (Aplodinotus grunniens)	Varied from 0 to more than 12 months

The data on cold-storage life of other species of fresh-water fish stored either as dressed fish or as fillets are given in table 1 (this card, over).

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 ABSTRACTER: D. T. Miyauchi

2.14 OBSERVATION OF JAPANESE HIGH-SEAS SALMON GILL-NET FISHERY OFF HOKKAIDO

Atkinson, C. E.
Commercial Fisheries Review 16, No. 10, 17-19 (October 1954)

Japanese exploitation of the salmon resources on the high seas of the North Pacific has been increasing in recent years. At the invitation of the Japanese government, the author on May 31 and June 1, 1954, accompanied the sixty-four-foot research vessel Oyasio Maru as an observer.

All fishing is done by gill nets made up of a number of single nets, each 80 meters (262.4 feet) long and six meters (19.5 feet) deep, with a mesh size of four and one-half inches stretched. The individual nets are fastened together to form a single gill net which, in this case, totaled ninety-four units or about four and three-quarters miles in length. The majority of the nets were of nylon hung in a manner similar to that described by Fukuhara (Commercial Fisheries Review 15, No. 2, 1-17 (February 1953)).

Salmon in the ocean are believed to be most abundant in areas of rapid temperature change, and temperatures of from 7° to 8° C. (44° to 47° F.) appear to be preferred. The relation of temperature to the success of the fishing operation was well demonstrated. Vertical temperatures at the fishing site were determined by reversing thermometers. Relatively warm water -- 6.2° to 7.3° C. (43° to 45° F.) -- was found in the upper fifteen meters, the temperature becoming much colder -- 3.2° to 3.6° C. (37° to 38° F.) --at the 25- and 50-meter levels (fig. 2). From vertical plankton hauls, food appeared to be more abundant in the upper warmer layer.

The net was set over a roller at the stern while the vessel was underway. It was fished from 6 p.m. to 1 a.m.

(over)

 ABSTRACTER: Roy C. Stevens

3.249

Table 1. Cold-Storage Life of Certain Fresh-Water Fish Stored Either as Dressed Fish or as Fillets at 0° F.

Species	Source	Date caught	Method of handling 1/	Estimated cold-storage life -- months
Smelt (Osmerus mordax)	Lake Michigan	March 1952	A	6
Eulachon (Thaleichthys pacificus)	Cowlitz River, Washington	April 1952	B	5
Lake trout (Cristivomer namaycush namaycush)	Lake Superior	June 1952	C	3 to 6
Buffalofish (Ictiobus species)	Mississippi River	June 1952	D	Less than 3

1/
Method A. Commercial pack; fish were headed, eviscerated, packed in one-pound waxed carton with cellophane overwrap, frozen, and shipped to Seattle in dry ice.
Method B. Same as Method A, except wax paper overwrap used.
Method C. Eviscerated fish were iced, shipped by railway express to Seattle, where they were filleted; fillets wrapped in moisture- and vapor-proof cellophane and frozen.
Method D. Frozen whole fish thawed and filleted; fillets wrapped in moisture- and vapor-proof cellophane and frozen.

2.14 (Cross References: 1.30, 1.015)

The net was lifted over the port side of the forward deck by two men; another removed the fish, and two others straightened the net. The net was then passed along the starboard side on rollers to the rear deck where it was carefully restacked.

Results of the night's operation totaled 76 chum salmon and 10 pink salmon. This was considered to be a commercially satisfactory catch.

2.111

The results of the same tests run at Daytona Beach, Florida to determine the effect of southern fishing conditions are even more striking.

Treatment	% Retained Tensile Strength After Exposure
Creosote oil	31
Pine Tar	0
Seine Tar	11
Copper naphthenate	66
Copper naphthenate in cordage oil	78
Copper naphthenate & creosote	91
Copper naphthenate & pine tar	68
Copper naphthenate & seine tar	82
Untreated twine control	0

The cost of copper naphthenating an average purse seine net is about two hundred dollars and the major net suppliers, both domestic and foreign, are equipped to do it. It is estimated that a net savings of at least one thousand dollars can be effected by this means -- not to mention the value of the set of fish that may be lost when a net finally gives out.

2.12 (Cross Reference: 1.2)

herring meal and oil factories could pay more, therefore, for the ocean herring than for the winter herring.

0.32 STUDIES ON JELLY-STRENGTH OF KAMABOKO. II. INFLUENCE OF pH ON JELLY-STRENGTH

Shimizu, Yutaka; Simidu, Wataru; and Ikeuchi, Tsuneo
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 3, 209 (1954) (English summary, tables and figures)

"The jelly-strength of the Kamaboko or the fish cake measured with our equipment gelometer has been found to increase the values rapidly from pH 5.0 to 7.0 of the mashed materials which were brought to different pH values by adding the phosphate buffer, NaOH or HCl."

0.32 SETTING PHENOMENON OF FISH MUSCLE. III. ACTION OF ORGANIC DENATURANTS ESPECIALLY ON THE FORMATION OF FRIABLE JELLIES

Migita, Masao and Okada, Minoru
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 4, 589-95 (1953) (English summary and figures)

0.32 STREAMING BIREFRINGENCE IN EXTRACTS OF MUSCLES OF AQUATIC ANIMALS

Okada, Minoru and Tada, Setsuko
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 3, 224 (1954) (English summary, figure, and tables)

0.38 THE RESPIRATORY ENZYMES IN THE RED MUSCLE OF A FISH. II. THE ACTIVITIES OF SEVERAL OXIDASES AS MEASURED BY THE WARBURG TECHNIQUE

Umemura, Kiyohiko
Igaku to Seibutsugaku (Med. & Biol.) 18, 204-7 (1951)
Chemical Abstracts 45, No. 14, 6232 (1951)

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Prevol'nev, T. I.
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Chemical Abstracts 45, No. 12, 5327 (1951)

0.38 STUDIES ON THE TRIMETHYLAMINE OXIDE-REDUCTASE. I. REDUCTION OF TRIMETHYLAMINE OXIDE IN THE DARK MUSCLE OF PELAGIC MIGRATING FISH UNDER ASEPTIC CONDITION

Kawabata, Toshiharu
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 4, 505-12 (1953) (English summary, figures, and tables)

1.2 THE BEHAVIORS OF THE SARDINE SCHOOLS BY FISH-DETECTOR. III. BEHAVIOR OF SARDINES WHEN ATTACKED BY DOLPHINS

Owatari, Atsushi; Matsumoto, Shigemori; and Kimura, Yukio
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 12, 1144 (1954) (English summary)

1.2 NORWEGIAN FIRM FREEZES HERRING IN ALGINATE JELLY

Anonymous
U. S. Department of the Interior, Fish and Wildlife Service, Fishery Products Report No. S-131, Seattle, Washington, July 8, 1954)

(Abstract of this article appears under 3.238 page 5 - October 1954 issue)

1.2 FREEZING AND COLD STORAGE OF PACIFIC NORTHWEST FISH AND SHELLFISH. PART III. STORAGE CHARACTERISTICS OF SIX SPECIES OF OILY FISH

Heerdt, M. and Stansby, M. E.
Commercial Fisheries Review 16, No. 6, 1-5 (June 1954)

(Abstract of this article appears under 3.249 page 15 - October 1954 issue)

1.31 SPRING CHINOOK SALMON DIET EXPERIMENTS AT THE BONNEVILLE HATCHERY

McKee, Thomas B.; Sinnhuber, R. O.; and Law, D. K.
Fish Commission of Oregon Research Briefs 3, No. 2, 22-31 (August 1951)

(Abstract of this article appears under 9.14 page 5)

1.31 SECOND PROGRESS REPORT ON SPRING CHINOOK SALMON DIET EXPERIMENTS

McKee, Thomas B.; Jeffries, Ernest B.; McKernan, Donald L.; Sinnhuber, R. O.; and Law, Duncan K
Fish Commission of Oregon Research Briefs 4, No. 1 (December 1952)

(Abstract of this article appears under 9.14 page 5)

1.31 THIRD PROGRESS REPORT ON SPRING CHINOOK SALMON DIET EXPERIMENTS

Jeffries, Ernest R.; McKee, Thomas B.; Sinnhuber, Russell O.; Law, Duncan K.; and Yu, T. C.
Fish Commission of Oregon Research Briefs 5, No. 1 (March 1954)

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2.03 STUDIES OF FISH SPOILAGE. VI. THE BREAKDOWN OF CARBOHYDRATES, PROTEINS, AND AMINO ACIDS DURING SPOILAGE OF COD MUSCLE PRESS JUICE

Beatty, S. A. and Collins, V. K.
Journal of the Fisheries Research Board of Canada 4, No. 5, 412-23 (February 1940)

(Abstract of this article appears under 2.01 page 17 - October 1954 issue)

2.03 PROTEOLYTIC DECOMPOSITION OF HERRINGS

Baalsrud, Kjell
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Chemical Abstracts 45, No. 20, 9194 (1951)

2.03 THE FRESHNESS OF FISH AND THE AMOUNT OF HISTAMINE PRESENT IN THE MEAT. V. PRODUCTION OF HISTAMINE DURING THE AUTOLYSIS. 3.

Kimata, Masao and Kawai, Akira
Bull. Research Inst. Food Sci., Kyoto Univ. No. 11, 88-95 (1953)
Chemical Abstracts 47, No. 16, 8281 (1953)

2.111 MICROBIOLOGICAL STUDIES ON THE WEAKENING OF FISHING NETS

Kadota, Hajime
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 2, 120-135 (1954) (English summary and tables)

IV. On the aerobic cellulose-decomposing bacteria in the sea (2)
V. A taxonomical study on marine Cytophagas
VI. The microbiological deterioration of fishing nets during storage (2)

"Cellulose-decomposing bacteria belonging to genus Cytophaga were widely distributed in water and mud of Maizuru Bay. They constituted from 0 to 33.3% of the total number of aerobic cellulose-decomposing bacteria. The marine cellulose-decomposing Cytophagas may play an important role in the deterioration of fishing nets during storage after fishing, due to their comparatively high resistance to drying."

2.111 MICROBIOLOGICAL STUDIES ON THE WEAKENING OF FISHING NETS. III. THE MICROBIOLOGICAL DETERIORATION OF FISHING NETS DURING STORAGE (1)

Kadota, Hajime
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 4, 476-80 (August 25, 1953) (English summary, table and characteristics of bacteria)

"Fourteen strains of marine aerobic cellulose-decomposing bacteria were isolated from the fishing nets which had been stored, under dry conditions, for three months after fishing."

3.12 THE PRESERVATION OF "WET" FISH. PART 1

Riemann, H. and Bramsnaes, F.
FAO Fisheries Bulletin 7, No. 2, 49-65 (April-June 1954)

(Abstract of this article appears under 2.01 page 3 - December 1954 issue)

3.12 STUDIES ON PUTREFACTION OF AQUATIC PRODUCTS. XI. EFFECT OF ANTISEPTICS ON FISH MUSCLES

Simidu, Wataru and Kiriyama, Takahumi
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 1, 33 (1954) (English summary and figures)

"It was found that toluol, chloroform, and the thymol each had scarcely any antiseptic effect on fish muscles when applied singly, while thymol was found to be markedly effective when mixed with the toluol or chloroform."

3.12 ANNOTATED BIBLIOGRAPHY OF SUBTILIN: ASSAY, MICROBIOLOGICAL PRODUCTION, PURIFICATION AND CHEMISTRY, BIOLOGICAL ACTIVITY, AND RELATED COMPOUNDS

Lewis, J. C.
U. S. Dept. Agr. Bur. Agr. & Ind. Chem., AIC-168, 15 pp. (reissue with suppl., October 1950)
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3.12 KEEPING FISH FRESH IN SCANDINAVIAN AND OTHER LANDS

Borgstrom, Georg
Kaltetechnik 2, 106-12 (1950)
Chemical Abstracts 46, No. 22, 11488 (1952)

3.12 GREEN MEAT OF WHALE-MEAT HAM

Akiba, Minoru
Shokuryono Kagaku 1, 332-3 (1946-47)
Chemical Abstracts 46, No. 22, 11487 (1952)

3.12 PROLONGING THE PERIOD OF STORAGE OF FROZEN SPRATS FOR THE SPRAT INDUSTRY

Konokotin, G. S.
Rybnoe Khoz. 24, No. 7, 33-6 (1946)
Chemical Abstracts 46, No. 18, 8783 (1952)

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Southern Fisherman
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3.4 STUDIES ON FISH CURING. III. ON THE SMOKING CONDITIONS AFFECTING THE QUANTITY OF DEPRIVED FORMALDEHYDE

Murata, Kiichi and Ohoishi, Keiichi
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 10, 1015 (1954) (English summary, figure, and table)

"Larger amounts of formaldehyde are produced from the moist sample, when the sample is heated more quickly, and at a higher temperature."

3.4 INHIBITION OF MOULD DEVELOPMENT IN FISH PRODUCTS

Boyd, J. W. and Tarr, H. L. A.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 99, 22-23 (July 1954)

(Abstract of this article appears under 3.12 page 5 - December 1954 issue)

3.4 SMOKE FLAVOR AND ASCORBIC ACID AS PRESERVATIVES FOR FATTY FISH

Erdman, Anna Marie; Watts, Betty M.; and Ellias, Loretta C.
Food Technology 8, No. 7, 320-23 (July 1954)

(Abstract of this article appears under 3.12 page 7 - December 1954 issue)

3.5 INHIBITION OF MOULD DEVELOPMENT IN FISH PRODUCTS

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3.5 MOISTURE, SALT, TRIMETHYLAMINE, AND VOLATILE NITROGEN CONTENTS AND BACTERIAL COUNTS OF SALT-CURED MARINE FISH

Velankar, N. K.
J. Sci. Research (India) 11A, 359-60 (1952)
Chemical Abstracts 47, No. 22, 12684 (1953)

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Bulletin of the Japanese Society of Scientific Fisheries 19, No. 4, 579-80 (1953) (English summary)

4.14 STUDIES ON THE WHALE OIL. IX. FATTY ACIDS COMPOSITION OF THE PACIFIC BEAKED WHALE (BERARDIUS BAIRDII) OIL. PART 3. ON THE VISCERA OIL

Saiki, Masamichi
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 10, 1028 (1954) (English summary and tables)

"The content of the saturated fatty acids was 10.6% and the unsaturated acids 89.4%. The saturated fatty acids consisted mainly of myristic, palmitic, and a little quantity of stearic acids. The unsaturated fatty acids consisted of monoethenoid acids of C_{20}, C_{18}, C_{16}, C_{22}, C_{14} and a little quantity of C_{18}, C_{20}, C_{22} acids which were more unsaturated than monoethenoid."

4.14 WHALE OIL

Saiki, Masamichi and Mori, Takajiro
J. Agr. Chem. Soc. Japan 27, 188-93 (1953)
Chemical Abstracts 48, No. 16, 9722 (1954)

V. The fatty acid-composition of sperm whale oil.
1. The head-cavity oil.
VI. The fatty-acid composition of sperm whale oil.
2. The bone oil and the large-intestine oil.

5.41 THE PROPERTIES OF VITAMIN B_{12r}

Diehl, Harvey and Murie, Richard
Iowa State Coll. J. Sci. 26, 555-64 (1952)
Chemical Abstracts 46, No. 22, 11348 (1952)

5.41 STUDIES ON VITAMIN B_{12}. I. A CRYSTALLINE ACID FROM VITAMIN B_{12} WHICH STILL POSSESSES BIOLOGICAL ACTIVITY

Schindler, O.
Helv. Chim. Acta 34, 101-8 (1951)
Chemical Abstracts 45, No. 15, 6631 (1951)

5.41 THE CHEMISTRY OF ANTIPERNICIOUS ANEMIA FACTORS. V. INTERRELATIONSHIP AND STRUCTURE OF THE A-, B-, AND γ-COMPONENTS

Cooley, G.; Ellis, B.; Mamalis, P.; Petrow, V.; and Sturgeon, B.
J. Pharm. Pharmacol. 2, 579-90 (1950)
Chemical Abstracts 45, No. 7, 2936 (1951)

6.2332 STUDIES ON THE PREVENTION OF EMULSIFYING IN ALKALI-DIGESTION PROCESS

Kitamikado, Manabu and Tanaka, Haruo
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 12, 1219 (1954) (English summary and figures)

"If oil is to be separated from a solution containing protein soap, the concentration of protein must be kept lower than 6%, that of the soap lower than 9%, the pH value of the solution lower than 9.5, and the temperature higher than 70° C."

6.2332 UTILIZATION OF THE RESIDUE (GRAX) ACCUMULATING IN THE PRODUCTION OF COD-LIVER OIL

Perepletshik, R. R.
Rybnoe Khoz. 24, No. 8, 33-8 (1948)
Chemical Abstracts 46, No. 17, 8328 (1952)

6.2332 STUDIES ON THE EXTRACTION OF VITAMIN OIL FROM THE LIVER OF THE DOGFISH

Tachino, Shinko and Tanaka, Haruo
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 4, 533-36 (1953) (English summary and tables)

6.249 THE DESTRUCTION OF VITAMIN A IN FISH OILS

Novikova, E. I. and Pereplettschik, R. R.
Rybnoe Khoz. 26, No. 9, 56-61 (1950)
Chemical Abstracts 47, No. 21, 11662 (1953)

When fish oils are stored above 0° the so-called induction period is followed by an enrichment in superoxides of the free fatty acids, aldehydes, hydroxy acids, and other oxidation products. This renders the oil rancid and accounts for the destruction of vitamin A.

6.249 CHANGE IN VITAMIN A CONTENT IN SALTING AND STORAGE OF WHALE LIVER

Mrochkov, K. A.
Rybnoe Khoz. No. 3, 59 (1953)
Chemical Abstracts 47, No. 14, 7162 (1953)

"Storage for 4.5 months at -3 to 19° over the winter months of whale liver resulted in the following losses of vitamin A with different methods of treatment: 14-33% with dry salt in the barrel; 29% with dry salt in a tank, with spermwhale specimens; 20-35% with dry salt in a barrel, with bluewhale specimens."

6.55 FEED MADE BY FERMENTING FISH WASTE

Tada, Seiji and Nakayama, Ohki
J. Utilization Agr. Products (Japan) 1, 132-4 (1954)
Chemical Abstracts 48, No. 19, 11670 (1954)

Fish waste was blended and mixed with a fermentative substance such as molasses or blended with sweet potato, and the mixt. was adjusted to pH 5.0 with dil. HCl. Lactobacillus, yeast, and clostridium, as fermentative microbes, were added and the mixt. was stored at 20-25°. Lactic acid fermentation prevented putrefaction. Ashes became sol., and protein became easily digestible. The fermentation substances can be used as feed.

6.55 HYDROLYSIS OF PROTEIN SUBSTANCES IN THE ENSILAGE OF FISH

Petersen, H.
Medd. Fiskeriminist. Forsogslab. (1952), 4 pp.
Food Science Abstracts 26, No. 3, 253 (May 1954)

An account is given of the extensive hydrolysis of the fish proteins, with consequent increase in the amt. of liquid, which occurs during the production of fish silage. The nutritive value of the silage as a feeding-stuff does not appear to be impaired.

7.522 SEPARATION AND IDENTIFICATION OF AMINO ACIDS FROM PROTEIN HYDROLYZATES BY CIRCULAR PAPER CHROMATOGRAPHY

Giri, K. V.; Krishnamurthy, K.; and Venkatasubramanian, T. A.
Current Sci. (India) 21, 11-12 (1952)
Chemical Abstracts 46, No. 15, 6999 (1952)

7.522 FILTER PAPER CHROMATOGRAPHY OF AMINO ACID MIXTURES AND PROTEIN HYDROLYZATES

Andrade, Sylvia O.
Ciencia e cultura 1, 183-190 (1949)
Chemical Abstracts 45, No. 9, 3893 (1951)

A review (including tech. details) with 25 references.

7.522 THE SEPARATION OF SMALL AMOUNTS OF AROMATIC AMINO ACIDS

Hall, David A. and Tiselius, Arne
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Trend 23, 17-20 (1950)
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7.53 SOME OBSERVATIONS ON EXTRACTION AND IODINE VALUES OF FAT FROM FISH TISSUE, PRESS CAKE AND MEAL, AND ON PEROXIDE VALUES OF MEAL FAT THE FIRST DAY

Olafsson, Pall
Timarit Verkfraeoingafelags Islands 38, No. 4 (1953)

(Abstract of this article appears under 6.14 page 9 - November 1954 issue)

7.53 A RAPID AND EXACT METHOD FOR DETERMINATION OF THE FAT CONTENT IN FOODS AND FODDERS, ESPECIALLY IN FISH MEALS

Seeler, Th. and Dietrich, R.
Landw. Forsch. 3, 43-6 (1951)
Chemical Abstracts 45, No. 16, 7271 (1951)

7.53 THE DETERMINATION OF FAT IN FOODS, ESPECIALLY IN HERRINGS

Brandes, C. H. and Dietrich, R.
Deut. Lebensm. Rundschau 48, 165-9 (1952)
Chemical Abstracts 46, No. 21, 10479 (1952)

7.81 COLORIMETRIC METHOD FOR MEASURING THE QUANTITIES OF AMMONIA IN FISH MEAT. III. ON THE RAPID METHOD

Ota, Tuyuo and Oshiro, Zentaro
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 21, 1150 (1954) (English summary, figures and tables)

"Five grams of finely minced fish meat was extracted with 10 volumes of water by vigorous shaking by hand for about one minute and filtered through a gauze or a cotton cloth. To 10 cc. of the extract was added 2.5 cc. of 15% sulphosalicyclic acid containing 5% of sulphuric acid and 1.5 g. of active carbon, and then it was filtered after being adequately mixed up. To 1.0 cc. of the filtrate taken in the colorimetric tube was added 4.8 cc. of the mixture of 1.2% sodium hydroxide with 4.2% Rochelle salt (1:1) and further to the mixed solution was added 0.2 cc. of Nessler's reagent. Color-intensity was immediately compared with the standard color solution."

7.81 STUDIES ON PUTREFACTION OF AQUATIC PRODUCTS. XII. ON PUTREFACTION OF BLOODY MUSCLE

Simidu, Wataru and Hibiki, Sigeuyuki
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 3, 206 (1954) (English summary, tables and figures)

"The development of the volatile base was found to be larger in quantity in the bloody muscle than in the ordinal muscle."

7.89 STUDIES ON THE METHOD FOR TESTING THE SPOILAGE OF FOOD. VII. A NEW RAPID METHOD FOR DETERMINING FRESHNESS OF "KAMABOKO"

Tomiyama, Tetuo; Yone, Yasuo; and Sugawara, Norisuke
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 4, 551-54 (1953) (English summary, figures and tables)

The freshness of "Kamaboko" can be estimated by the catalase activity determined on a 5 cc. portion.

7.89 PRESERVATION AND PREPARATION OF MEATS AND MEAT PRODUCTS. I. THE RELATION BETWEEN THE FORMALIN REACTION AND THE FRESHNESS OF FISH

Sasaki, Rinjiro and Fujimaki, Masao
J. Agr. Chem. Soc. Japan 24, 452-5 (1951)
Chemical Abstracts 46, No. 16, 7670 (1952)

7.89 A SIMPLE CHEMICAL TEST FOR FRESHNESS OF AQUATIC FOOD PRODUCTS

Kajikawa, Foyoaki
Igaku to Seibutsugaku (Med. & Biol.) 21, 1-4 (1951)
Chemical Abstracts 46, No. 21, 10480 (1952)

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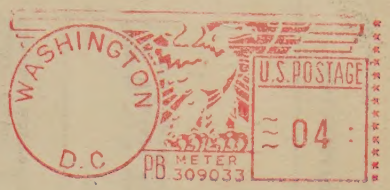

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